



Forretningsmodeller for Mobilspill

En studie av Fun Run

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Abstract

The mobile application market have seen a significant rise in popularity over the last years. Many tries to take advantage of this by creating games for mobile platforms, yet few succeed. Fun Run, created by Dirtybit which consists of only a few students from NTNU, managed to reach the number one spot on the Apple App Store in USA. This report aims to find out how this happened, as well as if there are any factors that needs to be present in order to create a successful mobile game.

This thesis is a case study of the game mobile game Fun Run. It consists of a pre-study and the case study. The pre-study looks at the various mobile platforms, business models, game categories and market effects and game design. The case-study consists of three parts; data on usage and social media, a survey answered by the users of Fun Run, and an interview with both a developer and a support staff.

Based on this, this report concludes that there was a combination of factors that made Fun Run so popular; the game was very unique when it came out, it had a good business model, and the use of social media. In-app purchases is the best business model for mobile games at the time, and a good integration with social media, specifically Facebook, is very important in order for a game to become popular and successful.

Sammendrag

Markedet for mobile applikasjoner har de siste årene opplevd en enorm økning i popularitet. Mange prøver å utnytte dette ved å lage mobile spill, men veldig få klarer å oppnå suksess. Fun Run er et spill som er lagd av Dirtybit, et selskap bestående av studenter fra NTNU, klarte å nå førsteplassen på topplisten til Apples sin App Store i USA. Denne rapporten prøver å finne ut hvordan dette skjedde, og om det er noen faktorer som må være tilstede for at et mobilspill skal kunne bli populært.

Denne avhandlingen er en case studie av mobilspillet Fun Run. Den består av en forundersøkelse og case studien. Forundersøkelsen ser på de forskjellige mobile plattformene, forretningsmodellene, spillkategoriene, så vel som markedseffekter og spilldesign. Case studien består av tre deler; informasjon om bruk av Fun Run og sosiale medier, en spørreundersøkelse gjennomført av brukerne av Fun Run, samt et intervju med både en utvikler og en som jobber med brukerstøtte.

Basert på dette konkluderer rapporten med at det var en kombinasjon av faktorer som gjorde at det gikk så bra med Fun Run; spillet var veldig unikt når det kom ut, det hadde en god forretningsmodell, og god bruk av sosiale medier. "In-app purchase" fremstår som den klart beste forretningsmodellen for mobile spill for tiden, mens en god integrasjon med sosiale media, og da spesielt Facebook, er ekstremt viktig for at spill skal kunne bli populært.

Preface

This project is a master thesis written at the Norwegian University of Science and Technology, during the spring of 2013. The project is a case study of the mobile game Fun Run, which is made by Dirtybit. The author of this thesis is a part-time employee at DirtyBit as a community manager/support staff.

The case study is conducted while the game is still doing very well on various application stores throughout the world.

Stakeholders

Jonas Eikli

Jonas is the author of this thesis, and the person responsible for performing the case study.

Main concerns: To answer the research questions posed. The quality of the case study and the report. To make sure that the study is properly conducted, and that the statements made are well reasoned.

John Krogstie

John is the course staff representative and the advisor during the project.

Main concern: The quality of the report, and the academic value of the results.

Erlend B. Haugsdal

Contact person from Dirtybit, as well as co-creator of Dirtybit together with **Nicolaj B. Petersen**. They created Fun Run together with **Martin N. Vagstad**.

Main concern: To help with access to the information required to do the case study. To be interviewed.

Assignment

Mobile applications, including mobile games, are a part of an ecosystem of computer systems and content which consists of several stakeholders working on creating, developing and publishing (parts of) the solution. Even though it is simple to publish new applications (i.e. through the appstores), we know little about what mechanisms plays a part in enabling an application to become a success in such a way that it generates revenue.

The project is performed as a case study, where the student follows the development in usage of the mobile game Fun Run created by the game studio Dirtybit. Various methods are used to understand these kinds of innovation processes, including methods in social networks, interviews and surveys. The student shall chose a fitting method, with regards to the case. The goal of the assignment is to create an artifact explaining what mechanisms affects mobile apps, helping them to become successes and generate revenue. The artifact should be evaluated in relation to the game investigated in the case study.

Acknowledgments

I would like to thank the following people for helping me with this master thesis:

John Krogstie for begin my advisor, answering questions and providing helpful insights throughout the entire project.

Erlend B. Haugsdal together with **Martin N. Vagstad** and **Nicolaj B. Petersen**, for taking time to answer questions regarding Fun Run and Dirtybit, as well as for doing an interview with me.

Matthew Guise for doing an interview with me.

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Part I

Introduction

Chapter 1

Introduction

In 2008, Apple launched the iPhone, and with it a new market for applications for smartphones. This market have grown non stop since the beginning, and is today consisting of hundreds of thousands of different applications who have been downloaded billions of times on several different platforms.

Many try to get a piece of this market, yet very few succeed. According to VisionMobile[1] as many as 67% of developers that make applications are not making enough money to sustain them or their business, which is, according to VisionMobile, making less than \$500 per month per application.

Despite these poor chances, a group of students at from the Norwegian University of Science and Technology (NTNU) managed to create a game that made it all the way to the top of the lists in the iPhone App Store, and made a lot of money in doing so.

This case study will investigate how their relatively simple looking mobile game, Fun Run, became such a huge success, as well as take a brief look at the mobile game market in general.

1.1 Motivation

Mobile applications (apps) is a market that has exploded in size the last years. Since Apples App Store launched July 10, 2008, 40 billion apps have been downloaded. Almost half of them was downloaded in 2012, and over 2 billion in December 2012[2]. Google, with their Play Store, reached 25 billion downloaded apps by September 2012[3], and 48 billion by May 2013[4], since its launch October 22, 2008.

For the developers of the apps that manages to get to the top lists of the App Store and Play Store, there usually is a lot of money to be made. Any application that manages this will almost always be downloaded millions of times and, depending on how the developers decide to monetize the app, make millions of dollars.

However, as very few of the applications that are released on the application

markets generates profit, it would be interesting to find out what makes an app achieve success.

Fun Run is the first, and so far only, Norwegian application to make it to the top of the Apple App Store, and on top of this, it is made by a group of relatively unexperienced students. This is a unique opportunity to look at what happens before, during and after an app hits the number one spot in the App store.

1.2 Project Goals

This report aims to answer the following research questions:

- How did Fun Run become so successful?
- What factors are important for a mobile game to achieve success?
- How does the choice of a business model affect the popularity of a mobile game?
- What are the differences between creating mobile games, and games on other platforms?

1.3 Report Structure

This report is made up of three parts, each consisting of several chapters and sections. These parts are the introduction, the pre-study and the case-study.

The first part consists of an introduction chapter, Chapter 1, as well as a Chapter 2, describing the research method used; the case study.

The second part of this report is the pre-study. Chapter 3 describes the case that is studied in this report; Fun Run. In Chapter 4 and 5, the different mobile platforms and business models are examined. The various categories of mobile applications are described in Chapter 6. Lastly, market powers affecting mobile games as well as game design, are examined in Chapter 7.

The third part is the case study. The case study is made up of, in Chapter 8, an analysis of available data and media, in Chapter 9, a survey, and, in Chapter 10, interviews with a developer and support from Dirtybit. Lastly, the results of the case study is discussed in Chapter 11, and a conclusion is made in Chapter 12, together with suggestions and further work.

Chapter 2

Research Method

The research method used in this project is the case study, with a single case. A case study is an intensive analysis of an individual unit, in this case the game Fun Run, focusing on *how* and *why* things happen, in relation to a context.

Robert K. Yin[5] defines a case study like this:

1. A case study is an empirical inquiry that
 - investigates a contemporary phenomenon in depth and within its real-life context, especially when
 - the boundaries between phenomenon and context are not clearly evident.
2. The case study inquiry
 - copes with the technically distinctive situation in which there will be many more variable of interest than data points, and as one result
 - relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result
 - benefits from the prior development of theoretical propositions to guide data collecting and analysis.

From this definition, it is clear that a case study fits very well when studying the success of Fun Run.

The case study in this report is built up from three parts; data from application analytics, databases and media, a survey answered by the Fun Run users, and interviews with a developer and support.

The data from these sources will be collected and analyzed, before it is used to create a conclusion, which will answer the research questions posed.

Part II

Pre-study

Chapter 3

The Case

This chapter will give an introduction of the object of this case study, the mobile game Fun Run, and the developers that made the game.

Section 3.1 will describe the game, while Section 3.2 will describe the technology behind the game. A brief timeline of milestones and events reached by Fun Run prior to this study is shown in Section 3.3. The developers that made the game, Dirtybit, will be introduced in Section 3.4.

3.1 About Fun Run

This section will give a description of the mobile game Fun Run, which is the object of this case study.

Fun Run is a multiplayer racing game that is available to both Android and iPhone/iPad. Four players can race against each other, in real time, and the goal of the game is to be the first person to reach the finish line. This is done by traversing a course riddled with obstacles, while at the same time avoiding attacks laid out by the other players, and trying to hit the other players with your own attacks.

The game is played by using two buttons; one for jumping and one for using *power-ups*. The power-ups are different abilities that can be picked up from boxes at certain places during the course. These abilities include, among others, a temporary speed-boost, a shield, a bear-trap and a lightning attack.

When a player get hit by an attack, and is not protected, he will be killed. When a player is killed, he will stop running for a few moments, before starting again. All players run automatically towards the finish line, all the player needs to do is to jump to get over obstacles and up hills. A typical round lasts for about one to two minutes.

Some pictures from the game can be found in Figure 3.1. Figure 3.1a shows what the game looks like while in a race. Figure 3.1b and 3.1c shows the pre-game and post-game lobby, respectively. The market, where new avatars and accessories can be bought, is shown in Figure 3.1d.

The game is based on an in-app purchase business model, where the game is



Figure 3.1: Screenshots from Fun Run.

free, and the players can buy in-game coins for real money. These coins are used to buy cosmetic changes for the character in the game. Players also get some money by simply playing the game (higher placement in a race gives more coins), but for many players, this is not enough. The cosmetic items that can be bought includes new avatars, hats, shoes and trails. These items are only cosmetic, and does not provide any advantages in the game.

Players can choose between 4 coin-packs when buying coins; they are \$1.99 for 1000 coins, \$4.99 for 5000 coins, \$9.99 for 20 000 coins and \$24.99 for 60 000 coins. The prizes for the items in the store range between 50 and 50 000 coins.

Fun Run has three different game modes; *practice*, *quick play* and *friends*. In the practice mode, you play against other players controlled by an AI, so there are no other real persons, and it is available even when offline. Quick play is the main mode, where you are put in a game with three opponents chosen randomly from other people playing quick play. The players can vote on which map to play, from a selection of two randomly selected maps. The friend mode is for playing against friends. Any player can chose the friend mode, and will get an option to invite friends to play with him. He can also chose which course to race on.

Friends can be added in the game by sending a *friend invite* using their user-name. When the friends accept the friend invite, both are registered as friends. Friends can be invited to play in the friend race mode, and it is possible to view the statistics of your friends in the leaderboards.

The leaderboards show your own statistics of you, your friends, and also the top 50 players in the world. The statistics are made up of the number of games a player has played, his win percentage, and his kills, deaths and suicides (players can accidentally kill themselves). Every player also has a rating which is used to sort the players. The players avatar is also showed.

The rating for every player starts at 1500, and is increased or decreased after every game, depending on which place the player get. A first place will get you +15 rating, a second place 5, a third place -5 and coming in last will give you -15, in a game with four players.

3.2 Technical Specifications

In this section, the technical parts of Fun Run is described. This includes how the game is developed and how the multiplayer part of the game works, and how it scales with more users.

Fun Run is developed using a framework called *Corona*¹. Corona is a framework for building mobile applications, which can be compiled to both Android, iOS, and the e-book readers Kindle Fire and NOOK. Fun Run is only available on Android and iOS, due to the lack of support for in-app purchases on the Kindle Fire and NOOK.

Using such a framework has enabled the developers to create Fun Run a lot quicker, and available to more people, than they could have done if they had to develop it to Android and iOS independently.

The game servers are hosted by *Amazon Web Services* (AWS)². AWS offers a complete infrastructure for applications and services that enables them to run in the cloud. This makes it reasonable easy to scale the capacity of the game servers, as it is very easy to just add more virtual servers.

When the game is running, the phones are communicating with the servers using TCP. The system has been built with a focus on sending as little data as possible. When a player connects to the game, he is assigned to one of many game servers, by a login, or social, server. The social server also handles friends and the market. When in a game, the phone is continuously sending the position of the character to server, which sends it to the other players in the game. This architecture is described further in Section 3.2.1. Between each position update from the server, the phone is calculating the position of the other players using their speed and acceleration.

To be able to play, all players must make an account with a username, and an optional email and password. The email and password is needed if players want to play from more than one device, or if they get logged out on the device. Players can also choose to attach their Facebook account to their Fun Run account, so they post game results to Facebook.

¹<http://www.coronalabs.com/>

²<http://aws.amazon.com/>

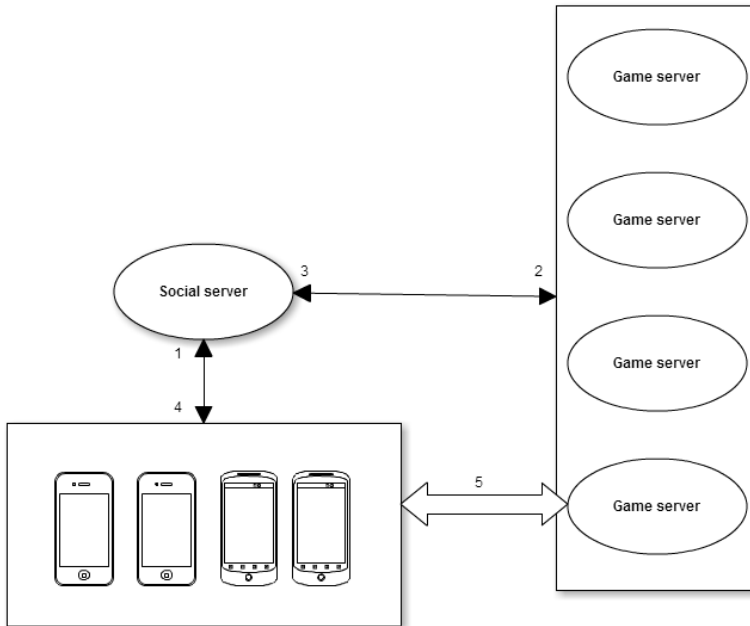


Figure 3.2: The architecture of Fun Run.

3.2.1 Architecture

The architecture of Fun Run is shown in Figure 3.2 and described below.

1. The player connects to the social server by logging into the game. The social server handles everything other than the actual races.
2. When selecting quick play, the social server will ask the game server which one the player should join.
3. The game servers uses a load balancing algorithm as well as a localization check based on the ip of the player to select a server for him to join.
4. The social server connects the player to the server with the ID returned by the game servers.
5. When the game is full, or a certain amount of time has passed, the race starts with the players connected to the same game. This is handled by one of the game servers.

3.3 Timeline

This section will give a brief description of milestones and achievements that was reached by Fun Run prior to this project. The milestones are described in Table

3.1, and the number of new users daily is shown in Figure 3.3. These findings are discussed further in Part 3 of this report.

Date	Milestone
30.08.12	Fun Run released on Google Play Store
30.08.12	Fun Run wins award for best mobile game of the year and the gamers choice award at Norwegian Game Awards (NGA)
05.09.12	Fun Run released on Apple App Store
29.09.12	100 000 registered users
08.10.12	1 000 000 registered users
26.10.12	Content patch released
15.11.12	Content patch released, support for login through Facebook added
11.12.12	Fun Run is ranked as the number one app in App Store in USA for two days
17.12.12	Fun Run is ranked as number 4 overall in Play Store in USA (highest yet)
18.12.12	Dagsrevyen shows an interview with co-creator of the game, Martin Vagstad
25.12.12	New record in registered users in one day; 489 572
06.01.13	10 000 000 registered users

Table 3.1: Milestones achieved by Fun Run prior to this project.

3.4 Dirtybit

This section will introduce the developer team who made Fun Run.

Dirtybit is a small developing team consisting of about 5 students from different fields, all studying at NTNU. There are three programmers, studying computer science, and two designers, studying industrial design.

Two of the programmers have previous experience from making games for mobile phones, as they have made and released a game called Drop the Box. The rest were unexperienced in the area.

There has also been other people contributing to the game. There was a marketer who did some work related to the launch of the game. Additionally, three people, including the author of this study, has been working on customer support and various other tasks.

Dirtybit has released one other game prior to Fun Run, namely Drop the Box, which is a single player physics-puzzle game based on dropping boxes into holes. This game was released in December 2011 and have been downloaded about 1000 times (the free version have been downloaded about 208 000 times). Drop the Box is examined closer in Section 11.1.2.

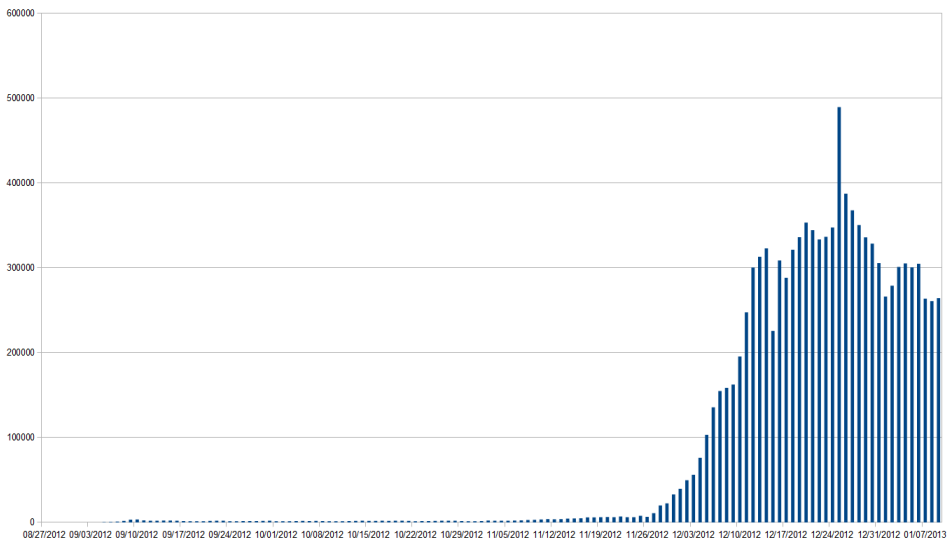


Figure 3.3: Number of downloads daily prior to this project.

Chapter 4

Platforms

This chapter will give a description of the most important platforms for mobile applications today. They are iOS, Section 4.1, made by Apple, and Android, Section 4.2, made by Google. iOS and Android together makes up 80% of the mobile developer mindshare[1], and 94.7% market share[6]. A comparison between those two are made in Section 4.3. Lastly, in Section 4.4, the various other, smaller platforms are discussed.

4.1 iOS - iPhone and iPad

iOS (previously iPhone OS) is a mobile operating system made by Apple Inc for their iPhones, iPads and iPods. Apple does not license their operating system to other hardware producers.

iOS was originally released in 2007, and in 2008 the Apple App Store opened. Since then, over 775 000 apps have been made and released on the App Store, which together have been downloaded over 40 billion times[2]. It is worth noting that not all applications are available to both iPad and iPhone/iPod, as the screen size is very different, and apps must be made to fit the big screen of the iPad.

Apple exerts strict control over its App Store. For developers to release applications on the App Store, they must pay an annual fee of \$99.00 for a license. Additionally, Apple manually tests and approves every application that is submitted. This usually takes about a week. If an error is found, or the application is disapproved for another reason, the developer must fix the issue and submit the app again. It is also only possible to develop applications for the App store using an Apple computer.

Because of this control, when a new app is ready to be released, or is updated, it usually takes at least a week from the app is ready, to when it is available to the users. However, issues with broken applications and malware is virtually non-existent in the App Store. So is applications that Apple does not want on their store, for example certain adult content[7].

4.2 Android

Android is a Linux-based mobile operating system made by Google. Android was unveiled in 2007, along with the *Open Handset Alliance*, which is an alliance of hardware, software and telecommunication companies who focus on open standards for mobile devices. This means that many different smartphone producers can use Android on their devices. The biggest producers of smartphones with Android are Samsung, HTC, LG, Sony and Huawei.

Due to the number of different Android smartphones that have been released, Android have struggled with fragmentation within the Android community. Different screen sizes, different chip-sets and different input mechanics is only some of the issues that has to be dealt with. The fact that the manufacturers, or even the carriers, are the ones who decides when a device gets an update, also means that there is a noticeable gap between which version of the operating system the devices run.

This fragmentation causes problems when developing applications, as special care must be taken to ensure the application is compatible with as many devices as possible.

Androids application store is called the *Play Store* (formerly Android Market). The Play Store had, in October 2012, 700 000 applications available, and in May 2013 it reached 48 billion downloads [4].

The threshold for releasing an application to the Play Store is lower than to the App Store. There is a one-time fee of \$25 to be registered as a developer, and to be able to charge money for the application, a merchant account must also be set up. Once this is done, the developer is free to submit applications to the Play Store. Additionally, Google does not test and approve every application that is submitted before making them available. An application is available almost immediately after it is submitted to the Play Store. This may lead to the content available has an overall lower quality than in Apples App store, but it makes life much easier for the developers. Google has recently taken steps to prevent malware from appearing in the Play Store, using automatic tests and checks.

4.3 Comparison

This section will compare Android to iOS. Android and iOS are the two biggest actors in the smartphone market at the time, by a huge margin. Because of this, it is interesting to see how they hold up against each other; what is similar, and what is different between the two.

Figure 4.1 shows how developers rank the two operating systems against each other when it comes to development cost, learning curve, development environment, documentation and support, app discovery and revenue potential. The most interesting thing in this figure is that iOS surpasses Android by a huge margin when it comes to the chances of an app being discovered and what the potential revenue is. This figure is retrieved from Developer Economics 2013[1], which is made by VisionMobile, and is the de-facto knowledge hub of the app economy.

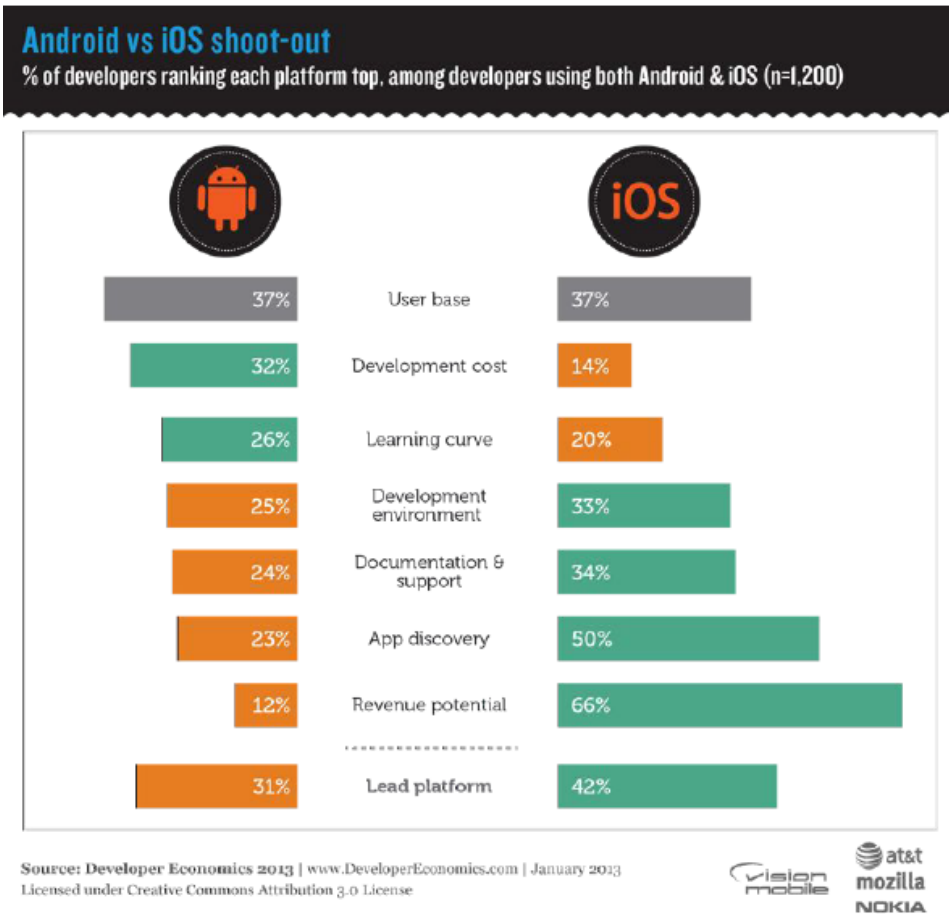


Figure 4.1: Developers opinions of Android and iOS.

Other differences between Android and iOS is the programming language; Java for Android and Objective C for iOS, and the time it takes to get an application to the market; a few hours for Android, and about a week for iOS.

The application markets on both the platforms works in a very similar way. There are top charts of the apps that are downloaded the most, and the ones that have earned the most, in the last days. For the iPhone App Store in USA, it requires about 80 000 downloads in 24 hours to reach the top 10 list[8]. There are also separate list of new and "trending" apps, as well as a section with apps that are featured or recommended by either Google or Apple. It is also possible to search for apps.

4.4 Other Platforms

This section will briefly describe other, smaller mobile platforms. Section 4.4.1 describes Microsoft's Windows Phone, and the Blackberry is described in Section 4.4.2.

4.4.1 Windows Phone

Windows Phone (WP) is Microsoft's contribution to the smartphone market. The first version of the WP operation system fit to compete against Android and iOS was WP7, which was released in November 2010. However, WP was by many not considered a real challenger until version 8, which came out in October 2012.

Due to this late arrival of a competitive operating system, WP has yet to seize a major part of the market. However, it will be interesting to see what happens in the years to come.

4.4.2 BlackBerry and Symbian

The BlackBerry (BB) started out as an email pager in 1999. It has come a long way from that, but have retained much of its focus on office tasks, over entertainment. This becomes clear when most of the BB devices comes with a physical keyboard.

Before the iPhone was released, BB had most of the American smartphone market. However, since 2011 their market share has plunged. An important reason for this is the lack of support for developers making mobile applications.

Symbian was a mobile OS that was used by Nokia before they changed to Windows Phone. It is still being maintained, but no more phones are released with Symbian OS.

Chapter 5

Business Models

There are many different ways to make money on applications. These business models are described in this chapter. The four methods most relevant to games are the paid application model, the freemium or in-app purchase model and ads. These are described in Section 5.1, 5.2, 5.3 and 5.4 respectively. Other business models are described in Section 5.5.

The various business models are not mutually exclusive, and are often used together. For example, it is very common to have a free, limited version of an application available, as well as a full version that costs money. In these cases, the free version might also have ads.

5.1 Paid Applications

The paid applications business model is the most straight forward of the business models. It is, as the name implies, based on paying for the applications when buying them.

Paid applications usually costs between \$1 and \$3, but may be more expensive. However, the more expensive applications are usually not games, but rather apps like office suites or navigation programs. If a game costs more than this, it is usually a mobile adaptation of a famous game from another platform.

The advantages of using this model is that the profit is directly linked to the number of times the app is bought and downloaded. The only goal is to get as many people to download the app as possible. Once they have downloaded it, it does not matter for how long they keep using it, or how they use it, since the profit is already made.

The disadvantage of this model is that the threshold for downloading the application in the first place is a lot higher than for free apps. The fact that there are so many apps available, some of which may be similar, free apps, makes it even tougher to get downloads when the app costs money. This, in turn, makes it harder to get to the top of the application store ranking lists. Because of this, many paid apps have limited versions, or versions with ads, available for free. This method is

called freemium, and are further discussed in Section 5.2.

5.2 Freemium

Freemium is a combination of the two aspects of the business model; free and premium. In many cases, developers make two versions of an applications; one free, and one premium. The free version os often limited in one or more ways, while upgrading or buying the premium version gives you full access. There might also be different levels of the premium part, it costs more to unlock more features[9, Ch. 6].

The free version can for example have ads, various features can be locked or the amount the app may be used can be limited.

A good example of a freemium service is *Spotify*¹, which is a music streaming service. Spotify is available for everyone for free, but only for a limited time each month, only on computers, and with ads playing between the songs and being shown in the program itself. Paying NOK49.00 per month removes the time limitations and the ads, and paying NOK99.00 per month also makes it possible to listen to music on various other devices and download the songs to play offline.

The way this is done in the case of mobile apps are usually to either have one free and one premium app, or have a free app with in-app purchase that gives access to the premium features. In-app purchase are discussed further in Section 5.3. Many developers also put in ads for the premium version, or other general ads, in the free version. Ads are discussed further in Section 5.4.

5.3 In-app Purchase

Applications that utilize the in-app purchase business model are usually free. The money are made by selling various features, advantages or items from within the app itself[9, Ch 8]. Many of the most profitable apps use this method to great success. Even though only a few percent of the players spend money, the fact that millions of players download the game can make this very profitable.

Because the application itself is free, the threshold for downloading it and trying it is very low for many consumers. This causes the apps to get massive numbers of downloads, which causes them to get to the top of the ranking lists. At the time of writing 96 of the 100 top grossing apps, and 98 of the top 100 games, in the App Store in USA have in-app purchase.

There are many ways to do in-app purchase. Many successful social games have made millions from in-app purchases, where players can buy advantages when playing against or together with friends or strangers. This approach is known as "pay-to-win", as the people who pay have an advantage over those who do not. In single player games, typically puzzle games, players can pay to move forward through the game if they get stuck, or need help. Another approach is to only sell

¹www.spotify.com

cosmetic changes. This is considered by many to be more fair, as no one gets any advantages they have not earned.

Some games that use this business models have virtually unlimited content which can be bought. These are often so called *persistent games*, Here, players can often buy perks that makes actions go faster, and this can be bought repeatedly. These types of games often makes a lot of money, because the people playing have to pay to stay at the head of the game. Unfortunately, these kinds of games have also received some negative attention from media, as kids have been playing them on a device belonging to a parent, and suddenly they have spent thousands of dollars without the parent being notified. An example is *Smurfs' Village*², where players can buy *smurf berries* for \$4 to \$49. Dagbladet had a story of a kid who spent almost NOK 24 000 at that game without the parents knowing³.

When using this business model, the issue of piracy, where the users illegally download the app for free, becomes non-existent. However, the developers must make sure that the in-app purchase is implemented securely, so the users can not get access to the benefits or features that are sold for free.

5.4 Ads

Using ads in applications have been a popular method of earning money from free apps since the launch of the smartphones. There are several different ways implement ads into an application. These include a banner at the top or bottom of the screen, full screen ads that must be exited manually to continue use of the app, and everything in between. Because of this, ads can be made as intrusive as the developer wants. A famous example of a mobile game with ads are Angry Birds, which showed an ad banner in the corner when playing, except for when the ad got in the way of the game play. When this happened, the ad banner was retracted, and reappeared later when it was no longer obscuring the game. It is also possible to set how often the advertisement is to be shown, or only for certain types of users[9, Ch. 7].

Several companies offer ads for mobile applications. The most important ones are Google, with AdMob, and Apple with iAd.

The ad companies can pay for different things. Some record the number of times the ad has been seen, so called impressions, while other only counts the number of times the ad has been pressed and accessed. In some cases, the ad company may count the number of times the people who pressed the ad has bought the service or product that was advertised, and pay based on that number.

Many developers also choose to have advertisements for other applications they have made, or premium functions of the same application, if they use the freemium model.

It is hard to know how much apps make from ads compared to the other models described above, as the money from ads does not count towards the grossing lists

²<https://itunes.apple.com/us/app/smurfs-village/id399648212?mt=8>

³<http://www.dagbladet.no/2011/10/14/nyheter/spill/innenriks/18622812/>

in the app stores. The earnings from ads goes through other channels, which the provider of the markets have very limited control over.

5.5 Other Business Models

This section will briefly describe other business models that are used by mobile applications, but not often by mobile games that aims to make money. Free and promotional applications are discussed in Section 5.5.1, applications that earn money on information gathered from their users are discussed in Section 5.5.2, and subscription based applications are discussed in Section 5.5.3. Lastly, merchandising is explained in Section 5.5.4.

5.5.1 Free/Promotional

Many companies choose to create a mobile applications to go along with various other products or services they offer. This can be as simple as a mobile version of a webpage, or more complex applications, like small games revolving around a product, or applications that interact with your car.

In these cases, the aim of the application is usually not to make money, but to support the main product or service.

5.5.2 Consumer Information

Some companies make services that are free to use by the consumers. Their services are free to use, but the price is paid by providing them with information about yourself, which they in turn can use to create advertisements directed at you.

In a way, the users of such services are not really their costumers, but rather their product.

Good examples of these companies are Google and Facebook.

5.5.3 Subscription

The subscription model is a model that is based on getting regular payments from the users. This is typically used by magazines, newspapers and other forms of entertainment that comes out every day, week or month.

Applications using the subscription business model are the apps that makes the most money per user [1]. However, it requires a constant stream of new content, as the users will quickly stop paying if the content stops coming.

Basically, the users pay for the content, or for the service, and not for the actual application, which is just a means to access the content.

Spotify is a good example of this business model as well, as users have to pay each month, or by year, to keep the premium features.

This business model have been used successfully by some computer games, mostly Massive Multiplayer Online Role Playing Games (MMORPGS), like *World of Warcraft*, however it has not made it way to mobile games yet. This is something we might see in the future.

5.5.4 Merchandising

Merchandising is the business model of earning money from other products that the main product itself. In the case of mobile applications, this would mean to not earn money from the application, but from products centered around the application. This can for example be cups, t-shirts, key rings, pillows, and so forth, with pictures of a character from the game on it.

Aiming for using this business model before the game is made, might not be a good idea, as it is a requirement to have a popular and easily recognizable game, and game characters, before any money can be made from merchandising. This business model will usually come in addition to some other business model.

The mobile game that is best known for merchandising is probably *Angry Birds*.

Chapter 6

Mobile Application Categories

When submitting applications to the application stores, the developer can choose to put the app within various categories and sub-categories. The biggest category is certainly games, described in Section 6.1, which has several sub-categories. The various other categories are accounted for in Section 6.2.

6.1 Games

Mobile games make up the biggest part of all mobile applications. This is easy to see, when looking at the top lists for the application stores, both for top grossing and top downloaded. The game category is divided into the sub-categories shown in Table 6.1. The sub-categories are different for iOS and Android, as Android have fewer sub-categories, and also have two categories that iOS simply do not have; gaming wallpapers and widgets.

Each of the sub-categories have their own top charts.

The category of a game is obviously important when it comes to how popular it is, as some genres are more popular than others and some genres fits better on a mobile platform, and what business model that fits with the game. It is clear that an app where you can play solitaire does not fit well with the in-app purchase business model, for example.

Even though there have been very popular games from most of the categories, some categories are generally more popular. Example of popular genres are Strategy, Trivia, Adventure, Family and Role Playing games. These are the categories that receives the most in-app purchases, and, with the exception of Trivia, also the categories that have people spend the longest sessions[10].

The categorization of applications can be a bit inaccurate, as it is the developers themselves that says which category their app belongs to. Additionally, games often fall under several categories at the same time. This makes predicting the popularity of mobile games based on their category quite hard, and it also becomes hard to

iOS	Android
Action	Arcade and Action
Adventure	Brain and Puzzle
Arcade	Cards and Casino
Board games	Casual
Card games	Game wallpaper
Casino games	Game widgets
Dice games	Racing
Educational	Sports games
Family games	
Kids	
Music	
Puzzle	
Racing	
Role playing	
Simulation	
Sports games	
Strategy	
Trivia	
Word games	

Table 6.1: Game sub-categories.

see a connection between a category and the popularity of applications in that category.

It could, however, be wise for a developer to try and make the game fit into a category that appeals to a lot of people. This way, they can get a large target audience and a bigger chance of getting more downloads.

Two types of games that are not considered their own category, but is important to mention, is *social* and *persistent* games. Many successful games fall under both of these types, as well as *casual*. Casual games are games that are easy to play, can be played by anyone, and does not the require the player to be very invested in it to be enjoyable.

Social games are games that are played in a social setting. This usually means that players can impact each others game through for example gifting of items, visiting each other in the game, or more directly playing together.

Persistent games which takes a very long time to play, and progress is made in the game world even when the player is not playing. This can for example be to build a house, if you are playing some sort of city building simulator, which might take 2 days to complete. However, there is usually other tasks that takes shorter time to complete, to keep the players engaged in the game. This is discussed later, in Section 7.3 and 11.1.1.

6.2 Other Categories

In addition to games, mobile applications come in many other categories. However, since this report is about mobile games, these other categories will only be mentioned briefly.

On smartphones, there is an app for almost any purpose. This includes applications for interacting with the phone, such as keyboards, as well as messaging services, social media applications, office suites, shopping, weather and so on. There are serious categories, such as productivity, medical, finance and communications, and there are less serious categories, such as comics, entertainment, lifestyle media and personalization.

Chapter 7

Market Effects and Game Design

This chapter will discuss various market effects that affects a game in the mobile game market. *Positive feedback* is described in Section 7.1 and *virality* is described in Section 7.2.

Additionally, this chapter will also describe various artifacts of game design that is important to think about when creating a mobile game. This is done in Section 7.3.

7.1 Positive Feedback

Positive feedback in a market means that the number of customers likely to purchase a product is also dependent on the number of customers that has already purchased the product[11]. An example of this is restaurants, where people are more likely to eat at a restaurant that already have some costumers, than at an empty restaurant.

The mobile application market is also a market that have positive feedback. The fact that the more downloads an application gets, the higher on top lists it gets, provides very strong positive feedback. An application that is on the top lists is automatically seen by a lot of people, as this is often the first thing they see when they enter the application stores. Many people also takes it as a sign of quality when an application already is popular, and are more likely to download and try the application because of this. The rating system will also work as a positive feedback, given that the users give a good score.

In addition to this, multiplayer games have an extra positive feedback effect, as people see their friends playing together, and will want to join in on the fun. People who already play the game will also want their friends to try it, so they have someone to play with. This effect can be increased by inciting the users to get their friends to play with them. This can be done either through rewards for recruiting other players, or simply by making the game more fun to play with friends.

A product in a market with positive feedback will typically experience demand following the *S-curve*[11], as shown in Figure 7.1. The typical behavior in such a market is that the demand starts out rather low, with a slow initial increase. However, as more people are starting using the product, demand increases. This goes on until it reaches the inflexion point, and demand starts to decrease again. This happens because the market starts to get saturated.

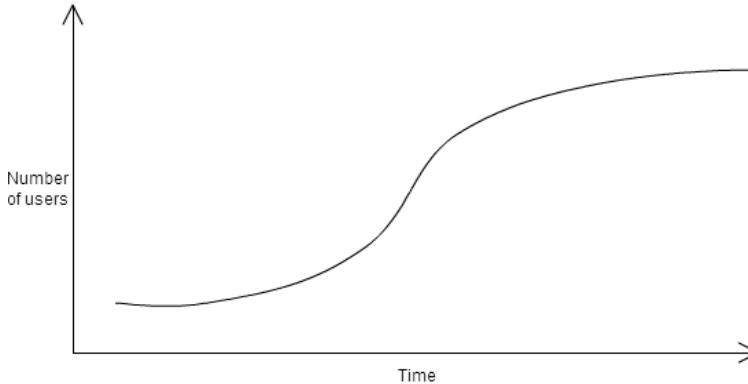


Figure 7.1: The S-Curve

7.2 Virality

Virality is defined as *the tendency of an image, video, or piece of information to be circulated rapidly and widely from one Internet user to another; the quality or fact of being viral* (Oxford Dictionaries).

Viral marketing, or advertising, is referring to using marketing techniques that use social networks to spread information, and increase brand awareness, about a product or service, through a self-replicating viral process, analogous to how a virus would spread. It can be delivered by word of mouth or enhanced by the network effects of the Internet and mobile networks[12].

When a company is performing viral marketing, care must be taken to do it the right way. If it is executed poorly, or is too obvious, the scheme might backfire and have the reverse effect. It is better to enable the players to spread the awareness of the product by themselves, than to either force the players to do it. Alternatively, the provider can pretend to be a user and try to talk well about the product, or spread awareness. This rarely works, as the users often are alert enough to see through this scheme. This is known as *astroturfing*.

7.3 Game Design

There are many aspects to game design that developers need to think about when creating a mobile game. Mobile games are inherently different from games that are

played on other platforms due to various reasons; the touch interface, the situations they are played, and the way they are distributed and can easily be updated. These considerations are discussed in this section. In Section 7.3.1, the interest curve of games are discussed.

Firstly, the touch interface is a big challenge, as this is unlike any other gaming platform that exists, and it is a very different way of interacting with the game. Certain categories of games fits better than others to such an interface, and developers must take this into account when creating games. For example games that require precision controls can be very hard to implement properly on a touch device. A good idea can often be to simplify the control scheme so that it fits with the interface. The same can be said regarding the screen size; smaller screens means the developers must be more selective in what they can give room for.

The situations in which mobile games are played also differ a lot from games on other platforms. Mobile games are often played for a short time, and often on the move. Typical scenarios are on the bus, while waiting for the dentist or in between school classes. Because of this, it is important that games can be played in short intervals, and that there is no problem if the play session gets interrupted. This, of course, poses an extra challenge for online and multiplayer games, as the connection will get interrupted. Additionally, when a player wants to play a mobile game, he shouldn't have to go through lots of menus and settings to get into the game. As the time might be short, it should not take a long time to get into the action.

When it comes to how the games on mobile platforms are distributed and updated, it is very easy to do this. The only thing the developer needs to do is to click a button, and the content is automatically distributed to everyone who wants it. This makes it extremely easy to create more content for a game after its launch, as well as to fix bugs. This is of course very convenient, but it might also cause the developers to be careless when creating games, thinking that if there is something wrong, they can easily fix it later.

Another thing that is important to think about is that the threshold for people to try a mobile game is a lot lower compared to games on other platforms. This is caused by the ease of access, as well as the low prices. Due to this, many people will download a game, maybe only to try it one time and never again if they did not like it right away. For mobile games, it is often harder to keep people playing a game, than it is to get them to try it. Because of this, a lot of thought have to go into creating a good interest curve for the game. This is discussed further in Section 7.3.1.

7.3.1 Motivation and the Interest Curve

There are many approaches that can be made in order to motivate players to play a game. These approaches play in the feelings of the players, causing feelings of progress, mastery and accomplishment. These approaches include exploration and discovery, becoming stronger, reaching goals, finding solutions, competition, and having a compelling storyline.

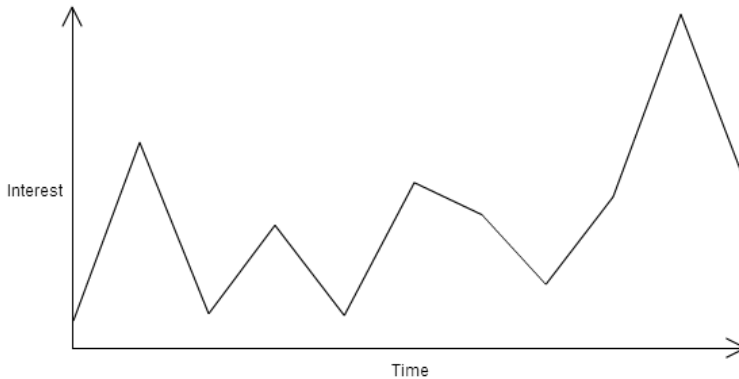


Figure 7.2: An interest curve

Games that are addictive usually use several of these approaches together. Examples are typical role playing games, where the player gets experience points by slaying monsters, which causes him to increase in level and become stronger, as well as having him go on a quest which involves a lot of exploring, following an interesting storyline.

Another approach is the interest curve. The concept of interest curves is all about keeping the players constantly interested in a product[13]. By considering the interest curves, developers can ensure that the players are engaged from start to finish. An example of an interest curve can be seen in Figure 7.2.

Schell[13] points out some important points in an interest curve:

Initial interest

The initial interest is the interest the user has for the product before trying it. This is the factors that persuade a user to try the product.

The hook

The hook is something that grabs the player's attention right at the beginning of the game. This can typically be an intro video, or getting dropped right into an action-packed part of the game.

Rising interest

Throughout the game, the general interest should increase. This has to be done to keep the game exciting.

Valleys

When creating interesting games, the developer must ensure that there are both exciting peak moments of interest, as well as calmer rest periods in the valleys. This contrast makes the action more fun and exciting.

Climax

The highest peak of the interest curve, the climax, should come towards the

end of the game. If the game does not end with a climax, but just fades out, the players will be left unfulfilled and with no desire to come back to the game.

The interest curve is an essential measurement for not only games, but also other kinds of entertainment, like movies or plays. However, it is extremely important to think about this when creating games, and particularly mobile games. As it is so relatively easy to get people to try a game, more focus must be put on keeping the players playing the game longer. This is also very important when games use the in-app purchase business model, as they do not earn money when people download the game, but rather during their use of the game.

Of course, not every game has to follow this interest curve, as some games have other means to motivate the players to continue playing. However, it is a good idea for a lot of game developers to think about this.

Part III

Results from Case Study

Chapter 8

Analysis of Usage Statistics and Media

In this chapter, data regarding the usage of Fun Run, as well as other factors that might impact the usage patterns and the results of this, will be displayed and analyzed. In Section 8.1, the number of downloads every day, as well as usage patterns, will be analyzed. Revenue are discussed in Section 8.2. The rating and ranking of Fun Run will be discussed in Section 8.3 and 8.4. In Section 8.5, both the media, and the social media, will be examined.

The information in the chapter is gathered from several sources; the Fun Run database is the source of new users registered daily. *Flurry* is a source for active users and user retention, while *Distimo* is a source for downloads, revenue, rating and ranking. The numbers for Facebook and Twitter are gathered from the Facebook page and Twitter profile of Dirtybit.

Due to different methods of tracking data, the various sources may give different numbers, for example regarding number of downloads. Flurry claims Fun Run have been downloaded a little over 20 million times, while Distimo says it is almost 18 million times. The difference here probably comes from Flurry counting people who have installed Fun Run several times, on the same or different devices, while Distimo only counts these cases one time. The total number of accounts created is a bit smaller compared to the number of downloads, due to some people downloading the game and not creating an account. However, some people create more than one account as well, so there is not a one-to-one relationship between number of downloads, and accounts created.

8.1 Usage

In this section the usage patterns of the players will be looked at. The number of downloads every day, the number of new and active users every day, user retention, and revenue are metrics that will be examined.

The number of downloads for Android and iOS each day, from the time Fun Run was released until the end of February 2013, are shown in Figure 8.1. From the figure, it is easy to see that the most downloads are from iOS, as they have a higher number of downloads almost every day. The difference here only started evening out in February. Fun Run also rose in popularity first among the iOS users. The total number of downloads, at the end of February, was $17\,714\,226$, where $10\,824\,103$ was from iOS and $6\,890\,123$ was from Android. It can be seen from the figure that there was a huge spike in downloads on the 25th of December, and that the number of downloads was generally high throughout the Christmas holidays. The reason for this is discussed later.

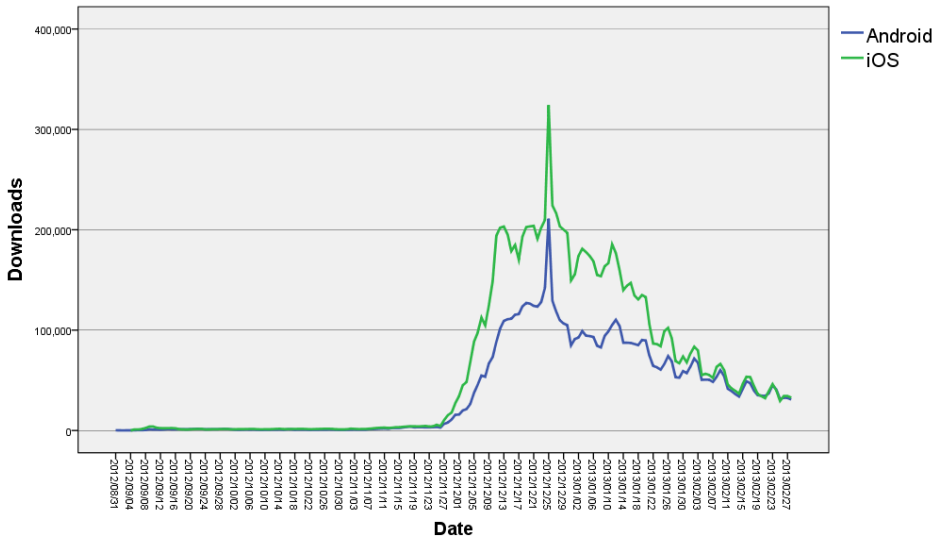


Figure 8.1: Downloads per day for Android and iOS.

Figure 8.2 shows where the most downloads have happened. This is not surprisingly USA, with 90% of the downloads.

The number of new and active users, as well as downloads will be explored in Section 8.1.1. User retention will be examined in Section 8.1.2.

8.1.1 New and Active Users

Figure 8.3 shows the number of new accounts made and the number of active users each day, from October 9th 2012 to February 25th 2013. As can be seen, the numbers of players rose quite slow in the beginning, until about November 26th, when it suddenly started increasing more and more rapidly. There can be several reasons for this, one of which is Positive Feedback, which is discussed in Section 7.1. Another possible reason is social media, which is examined in Section 8.5.

The day with most new accounts created was December 25th. The reason for this is presumably because many people got a new mobile device for Christmas,

Downloads

Metrics: One-Off Downloads **Apps:** Fun Run - Multiplayer Race, Fun Run - Multiplayer Race **Stores:** All Stores

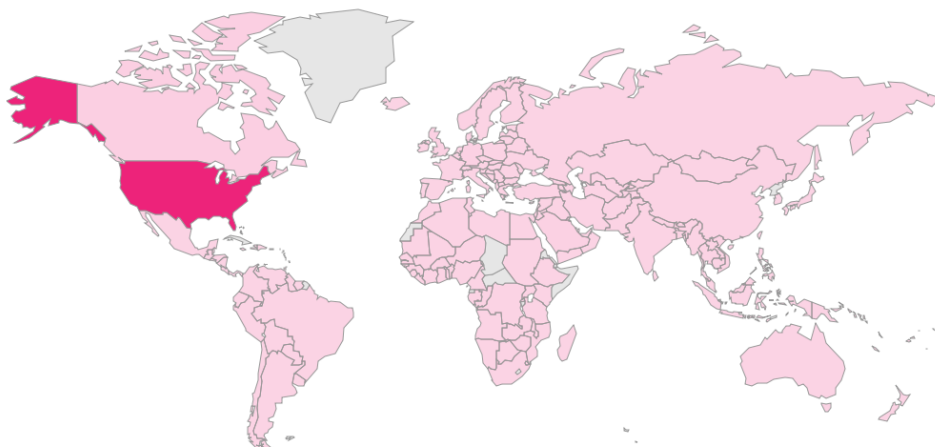
DISTIMO

Figure 8.2: Downloads by country.

and wanting to try it out with various applications and games. At the time, Fun Run was very high on the ranking lists, and made a easy choice for many people just wanting to try a game on their new device. The ranking lists are explored further in Section 8.3. The number of new users was also high throughout the holidays, probably because people have more time to play games when they do not have to go to school or work.

From the figure, it is clear that the most activity is during the weekends. Both the number of downloads, and active players increase drastically Fridays, Saturdays and Sundays.

8.1.2 User Retention

User retention, also called user lifecycle, is a metric for how long players continue to use an app after starting using it. This metric is analyzed by Flurry, which records when a user starts using the app in question, as well as every time consecutive time they use it.

At the time of writing (March 4th) Flurry have recorded 20 202 300 users. Of these, 6 771 637 users were only active the first day, and of these 5 341 529 users were one-session users. That is, they only opened the game a single time. 7 802 306 users returned to the game the day after first installing the game.

As can be seen in Figure 8.4, as time goes by, people gradually stop playing the game. This is only to be expected. Obviously, 100% of the people that try the game, use it the first day. After that, 66.88% still plays it the day after. After 11 days, half of the people that try the game still plays it. After a month, about 30%

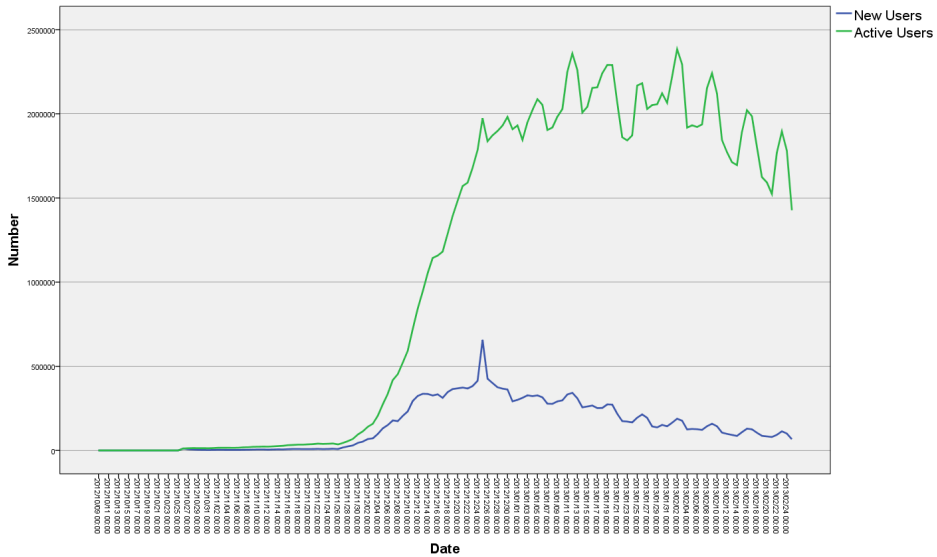


Figure 8.3: New accounts created, and active users each day.

of the users continue playing the game.

According to Flurry, the average user retention for social games after 30 days are 47%^[14].

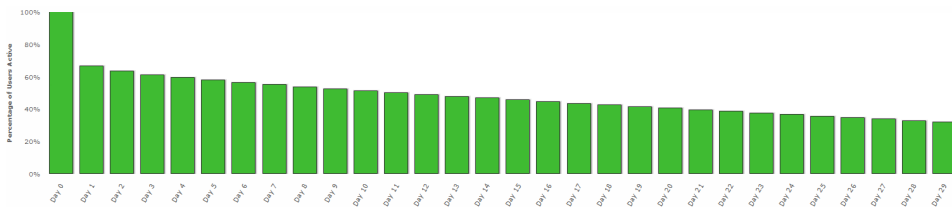


Figure 8.4: User Retention

8.2 Revenue

Fun Run makes money through in-app purchases, as well as ads. However, only the revenue from the in-app purchases will be analyzed in this report. The reason for this is that this was the intended business model for the game, and the fact that the money made from the ads are insignificant compared to the money made from in-app purchases. Additionally, ads were added to the game at a rather late date. The revenue¹ from the beginning through February are accounted for in this

¹Due to concerns from Dirtybit, the real revenue numbers are obfuscated, and only normalized values are used in this report.

report. The normalized revenue values is computed by subtracting the mean value from the actual value, and dividing by the standard deviation.

The normalized revenues can be seen in Figure 8.5. The most noticeable thing about this figure is the difference between Android and iOS. iOS users accounts for over 80% of the total revenue, while Android only accounts for under 20%.

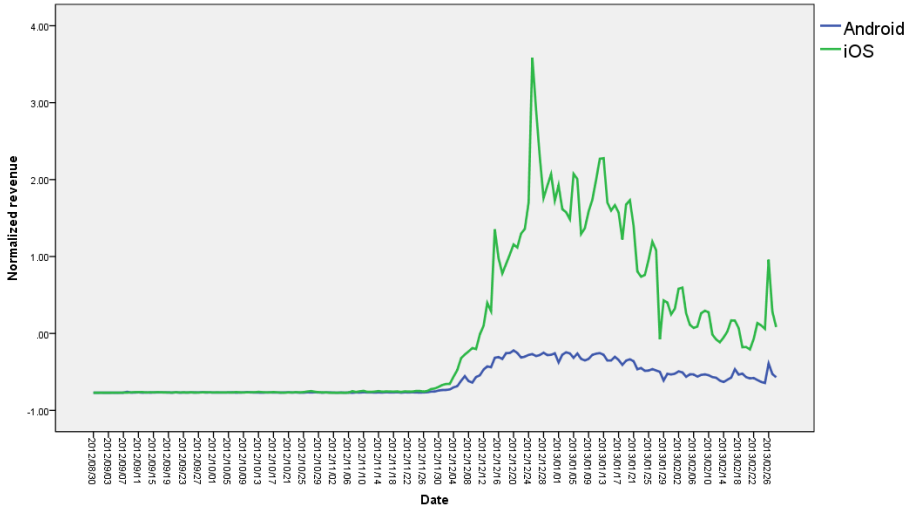


Figure 8.5: Normalized revenue over time for Android and iOS.

The biggest peak in revenue was on December 25th. This is not surprising, seeing as how many new players created accounts on that day. The peaks at December 15th and February 26th are at the same day as updates with new content was added to the game. The fact that so many more people bought coins on those days suggests that the players are hungry for more content, and if there had been more content available, they might have bought that.

Figure 8.6 shows the revenue by country. USA is clearly at the top of revenue generated, with 97%.

8.3 Rating

Rating is way to measure how popular an application is. Rating is a score which consumers of applications can publish after downloading an application. Users can give the app a score between one and five, usually represented by stars. The distribution of stars, the average score as well how many people have rated the game are shown very prominently in the application stores.

The rating given to Fun Run on Android and iOS are shown in Figure 8.7 and Table 8.1. As can be seen, the distribution of stars are quite similar, however, the Android users have given a lot more votes than the iOS users, and Android have more one and five ratings.

Revenue

DISTIMO

Revenue: All Revenue Apps: Fun Run - Multiplayer Race, Fun Run - Multiplayer Race Stores: All Stores Currency: US Dollar - USD Revenue Type: Share

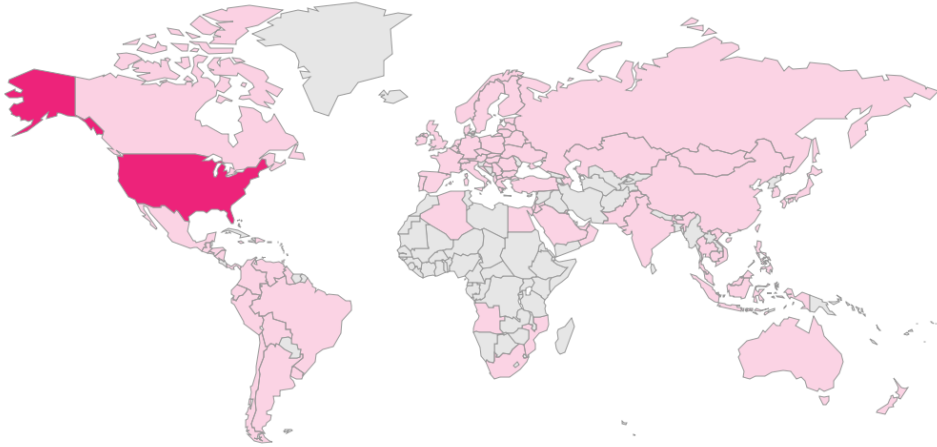


Figure 8.6: Revenue by country.

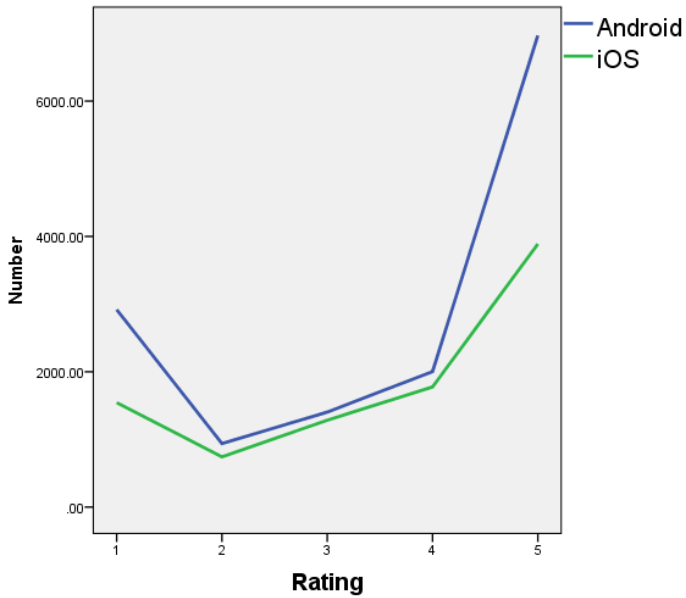


Figure 8.7: Rating for Android and iOS.

Rating	Android		iOS	
	N	%	N	%
1	2919	20.5	1545	16.7
2	939	6.6	743	8.0
3	1404	9.9	1284	14.0
4	2003	14.1	1776	19.2
5	6970	49.0	3888	42.1
Total	14 235		9 236	
Average	3.64		3.62	

Table 8.1: The ratings given by Android and iOS users.

Unfortunately, there is no way to get the rating over time. If this were available, it would show the number of one-star ratings increase drastically during periods of down-time where the servers have been unavailable and the game unplayable.

8.4 Ranking

In this section, the ranking lists that will be examined are from USA, as this is the biggest market. The ranking lists that will be looked at is the *top overall free* and the *top overall grossing* lists for Android, iPhone and iPad.

Figure 8.8 shows the ranking on iPhone, iPad and Android, for the categories *All Games*, and *Total (all applications)*. The data in the graph is gathered from the app appeared on the top lists, until the end of February. Because the ranking of an application is largely reliant on how well other applications are doing it, it is hard to draw any solid conclusions from this data. However, the figure shows that, on all platforms, Fun Runs ranking increased drastically in December, and started decreasing slowly after Christmas. The popularity peaked quite early, around the last half of December.

The best position reached by Fun Run was number one on both the *games* and *total* charts for iPhone, and *games* for Android. These positions was kept for 24, two and nine days, respectively. For *total* on Android and *games* on iPad, the best position was four, and for *total* on iPad it was seven.

The ranking on the grossing top lists is shown in Figure 8.9. Comparing this figure to Figure 8.8, it becomes clear that Fun Run began to rise on the grossing lists after securing a position high on the ranking list. It is also easy to see that Fun Run ranked higher on iPhone than on Android overall, and even worse on iPad.

The best grossing rank achieved is 17 for *games* on iPhone. For the other categories, the best ranking was 18 for *total* on iPhone , 68 and 100 for *games* and *total* on iPad, and 32 and 36 for *games* and *total* Android. The fact that the top grossing ranks are so much lower than the top ranks show that other games are better at generating revenue from the users.

Something that is interesting to note regarding the grossing rank is that on December 14th the Android rating plummeted down to under 400. The reason

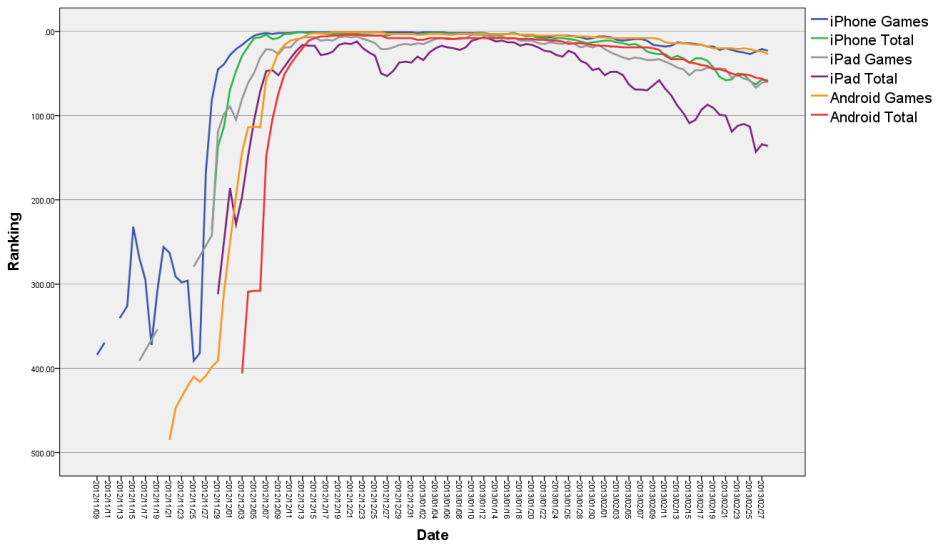


Figure 8.8: Ranking for iPhone, iPad and Android.

for this is that the servers were unavailable for some time due to an update being launched. Another thing is in the last days of February, the grossing rank on all iOS devices rose sharply, while it stayed mostly the same for Android. The reason for the sharp increase here is the release of a new avatar that the players could buy. However, it appears as though only iOS users rushed to buy this new avatar, as the Android ranking remains unchanged.

8.5 Media

This section will discuss Fun Run presence in both media and social media. Fun Run have appeared several times in media, despite Dirtybit making very little effort to publicize the game. This is discussed further in Section 8.5.1.

Social media plays a large part in marketing for any service or product, especially mobile games. Some of the most popular mobile games are social games that rely heavily on interaction with social media, typically Facebook.

Fun Run have used both Facebook and Twitter for both marketing purposes and communication with the users. This includes competitions, answering questions regarding the game, and information regarding updates. To get more likes and followers, Dirtybit have arranged several competitions where players who have liked the Facebook page or followed Dirtybit on Twitter could win in-game coins.

How Fun Run have used Facebook, and the results of that, are examined in Section 8.5.2, and Twitter in Section 8.5.3.

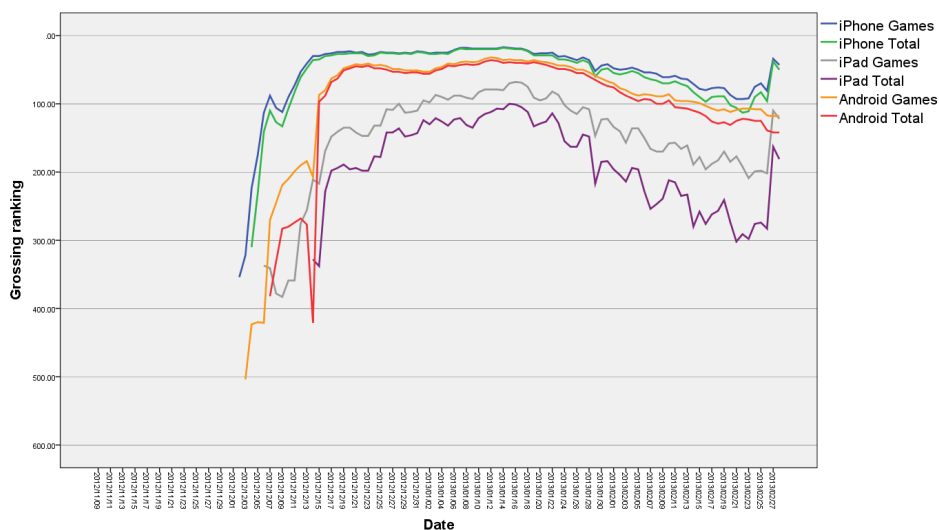


Figure 8.9: Gross ranking for iPhone, iPad and Android.

8.5.1 Media Attention

Despite Dirtybit having spent no money on marketing, Fun Run have received a lot of attention in media, mainly in Norway, but also some internationally. Right from the launch of the game, when Fun Run won awards for both best mobile game and the audience award at the Norwegian Game Awards (NGA), Fun Run have been discussed in media. The awards made sure Fun Run was mentioned in the articles regarding NGA, and the decision to release Fun Run immediately after NGA also allowed the people who read about it to try it out right away.

In the weeks following the release of the game, Dirtybit held a competition², where players could win a pallet of *Bamsemums* candy, by downloading the game and adding "Bamsemums" as a friend in the game. Two people each won a pallet of Bamsemums, the first on September 29th, and the second on October 13th. While this competition was going, Dirtybit had on several occasions a marketing booths at NTNU, where they promoted the game and the competition, and gave away free Bamsemums.

Fun Run quickly got acknowledged by Norwegian media, and September 15th Gamer.no included it in its monthly list of recommended mobile games³. Gamer.no gave Fun Run a score of 6 out of 10, and claimed that the game was fun to play with friends, but not by yourself. September 17th, Amobil.no published an article on Fun Run⁴, with the topic being that Fun Run was climbing on the Norwegian ranking lists for mobile applications.

After Fun Run became more popular, it got the attention of international media

²<http://dirtybit.no/konkurranse>

³<http://www.gamer.no/artikler/121792/manedens-anbefalte-android-spill/>

⁴<http://www.amobil.no/artikler/fun-run-klatrer-pa-applistene/112732>

as well. Many sites that does reviews of application made one of Fun Run, for example GameTrailers⁵ and CNET⁶.

GameTrailers review was posted December 18th. They claim that the game *"mostly went unnoticed"* after its release, but then *"a recent update sent this crude-looking title rocketing up the App Store charts"*. They go on to say that *"the game's biggest selling point is four-person online multiplayer, which it handles quite well"* and *"the game's visuals cannot compare to most free games these days. If anything, it resembles a high school project"*.

CNETs review was posted January 13th. They gave Fun Run 4 out of 5 stars, and claims that *"though this game can't decide if it wants to be for kids or adults, it definitely lives up to its name"*. They think the game looks like it is meant for children, but the gory animations points more towards adults. They go on to mention that you need an account to play, but *"Luckily, you don't need to give the game anything more than a username and you can sync with your Facebook for easy signup, too"*.

The international attention received by Fun Run caused a renewed interest in Dirtybit from Norwegian media. The Norwegian Broadcasting Corporation (NRK) interviewed Martin Vagstad December 18th, and the interview was aired in the news show Dagsrevyen⁷. The topic of the interview was that a few Norwegian students managed to do it so well in the USA. The local newspaper, Adressa, also published several stories about Dirtybit⁸, with mostly the same topics as NRK.

Additionally, a group of fans of the game have made a YouTube video about Fun Run called *Fun Run in Real Life to Dubstep!*⁹, which by April 8th have been watched almost 250 000 times.

8.5.2 Facebook

Before Fun Run was released, the developers from Dirtybit made a Facebook page¹⁰ for the game. The purpose of the page is to communicate with the users and to create awareness of the game.

Users of the game can *like* the page, and will then see what is being posted on the page by Dirtybit, and be able to post to the page themselves. Friends of the people who likes the page, or messages posted on the page, will also be able to see this, and will thus be made aware of the page and the game.

When promoting through Facebook, a company can choose to promote to the people who likes the page, or the people who likes the page plus their friends. This is not something Dirtybit have done, as this can be quite expensive.

At the end of February, the Fun Run Facebook page had about 72 000 likes. Including their friends, the number of people who can be reached through Facebook is about 20.6 million.

⁵<http://www.gametrailers.com/mobile-apps/43070/app-of-the-day-fun-run-multiplayer-race>

⁶http://download.cnet.com/Fun-Run-Multiplayer-Race/3000-2099_4-75763956.html

⁷http://www.nrk.no/nyheter/distrikt/nrk_trondelag/1.10846163

⁸<http://www.adressa.no/kultur/article6819041.ece>

⁹<http://www.youtube.com/watch?v=qYCKmZBQWmA>

¹⁰<http://www.facebook.com/funrungame>

Figure 8.10 shows the rate of which the Facebook page have gotten new likes and when people have been talking about the page. It also shows the rate of people who have *unliked* the page, meaning that they have revoked their connection with the page.

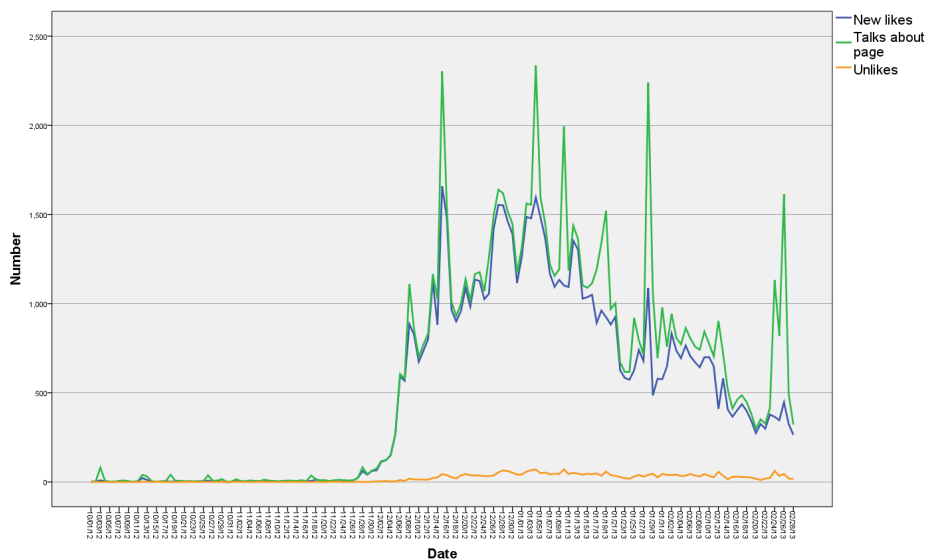


Figure 8.10: Likes and talk on the Facebook page.

As can be seen, the number of new likes and the amount that the page is mentioned follow each other very closely, while the people who stops liking the page is quite low and stable throughout. There are several spikes in days that the page have been discussed more than others, and have also attracted more likes than usual.

The first spike, on December 15th, was probably caused by the release of a large update to the game, which introduced a lot of new content, as well as support for iPhone 5 and login through Facebook. The second large spike was on the 4th January. That day, there had been a few hours where the servers had been down. The third large spike, 28th of January, a question was asked on the Facebook page, asking the users what feature they would like to see added to the game. The last spike, 26th February, was at the same day as a new update was released, with new content for the game.

Dirtybit primarily uses Facebook to announce updates to the game, like new avatars or patches. Posts like this are usually seen by 30 000 to 50 000 unique people, and get about 200 to 500 comments, sometimes more.

The comments people leave at posts are some times responds to the message in the post, but more often only their own username in Fun Run, or their username and a message to "add me". An example of this can be seen in Figure 8.11, which shows replies to a post regarding the servers coming back up after some downtime.

The players want others to add them as friends in the game.



Figure 8.11: Replies to a post regarding the servers coming up after downtime.

8.5.3 Twitter

In addition to the Facebook account, Dirtybit have a Twitter profile called DirtybitGames¹¹. Unlike the Facebook page, which is dedicated to the game Fun Run, the Twitter profile is representing the entire Dirtybit. However, since the release of Fun Run, that have been the main topic of interest on the Twitter profile as well.

Dirtybit have tried on several occasions to spread awareness of Fun Run on Twitter, by encouraging their users to use the tag *#funrun* and *tweeting* about the game. This has been done through several competitions, where players who tweeted the tag could win in-game coins. Players could also win coins by *following* DirtybitGames, which is the equivalent of liking the page on Facebook. Dirtybit now has a little over 7 300 followers.

The first such competition was held the 26th November, which is at the very beginning of the huge increase in downloads, ranking and revenue.

Twitter have something called *trends*, which are topics that are discussed the most at the time. When a topic is trending globally, it will automatically get a lot

¹¹<https://twitter.com/DirtybitGames>

of attention, as it will show up in the sidebar on peoples Twitter profiles. Unfortunately, there exists no record of which topics have been trending, but according to Dirtybit developer Erlend Haugsdal, #funrun was trending globally at one point during the sharp increase in popularity in USA.

Like on Facebook, most of the tweets containing the tag #funrun is people wanting others to add them as friends in the game. This is shown in Figure 8.12.

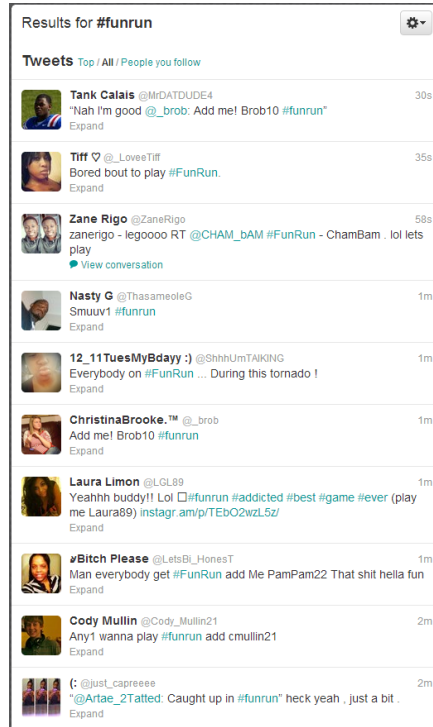


Figure 8.12: Twitter 10.12.12

Chapter 9

Survey

This chapter will describe the survey that was answered by users of Fun Run. Section 9.1 will describe how the survey was made and distributed, how the answers were collected and analyzed and what questions the survey consisted of. In Section 9.2, the result of the survey will be described.

The survey aims to get an overview of the Fun Run users, including information regarding their age distribution, devices used, usage patterns, important factors when deciding to try a game and to keep playing a game, how they heard about Fun Run, and their opinion on the various business models for mobile games.

9.1 Description of the Survey

The survey was made using Google Docs Form. Google Docs is a free web-based office suite. Programs for writing documents, spreadsheets and presentations are included, as well as a tool for making online surveys and forms. The results of the survey is automatically added to a spreadsheet, which can be downloaded as a number of different formats, including an excel document, a .pdf, or a .csv file.

A link to the survey was posted Dirtybits Facebook and Twitter page, on the 9th and 10th of February respectively. The Facebook post was seen by about 8600 persons before the survey closed. Dirtybit have about 7800 followers on Twitter, but how many of those who saw the post is hard to say. However, it would be safe to say that at least 10 000 people were made aware of the survey.

There was promised a reward comprising of "some in-game coins" to everyone who took the survey and registered their username. The survey also stated that it was anonymous, and the answers would not be linked to their username, should they choose to provide it.

The promise of receiving coins for participating in the survey was judged necessary to get enough answers. This, however, might introduce some noise as some people might have answered quickly and randomly just to get the reward.

After the survey was closed, the answers were downloaded in a .csv file and loaded into SPSS, which were used to find the results described in Section 9.2.

The questions in the Survey are listed in Appendix A.

It must be noted that since the survey was posted on Facebook and Twitter, the people who answered the survey are primarily people who follow Fun Run on those sites, and it can be assumed that these people may be more invested in Fun Run, and mobile games generally, than the average player.

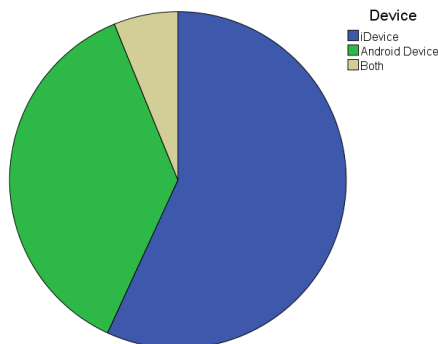
9.2 Survey Results

From February 9th, the survey got 830 answers before it was closed February 12th. However, due to some duplicates, the number got reduced to 779. In the case of identical duplicates, where every answer was the same, one of the answers was removed. For the cases where the username was the same, while the other answers differed from each other, both answers was removed. This had to be done because it is impossible to know which answer is the right or "true" answer. Doing this should remove some of the noise in the survey, caused by people who only took it to get free coins in the game, however, this number should not be too high to begin with, as the number of coins that was promised was very vague.

Some work were done on the answers before they were ready to be analyzed. The answers on what devices that were used to play on were simplified to either Android Device (Android phone and tablet), iDevice (iPhone/iPod and iPad) or Both (at least one from each of the previous categories. Additionally, a lot of varying answers was given to the question of nationality. This was especially true for USA, which had a lot of different variations (USA, America, United States, United States of America, and so forth). This issue was fixed manually.

The results can be seen in Figure 9.1 - 9.7 and Table 9.1 - 9.14.

Figure 9.1 and Table 9.1 show which device the players use to play Fun Run on. Not surprisingly, the majority of players play on iDevices, that is an iPhone, iPod or iPad. A fair number of people also play Fun Run on several devices, both on Android and iOS.

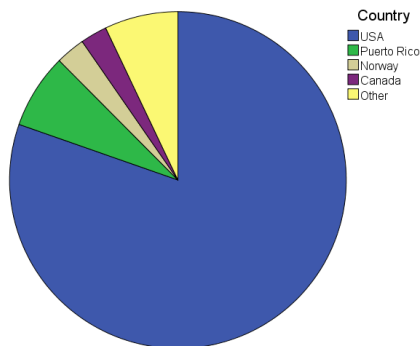


Device	N	Percent
iDevice	443	56.9%
Android Device	288	37.0%
Both	43	6.1%

Figure 9.1: Distribution of devices used to play Fun Run.

Table 9.1: Distribution of devices used to play Fun Run.

The nationalities of the players are shown in Figure 9.2 and Table 9.2. The vast majority of the players who answered the survey are from USA. Many are also from Puerto Rico, showing that Fun Run is quite popular there as well. This might be because they use the same application markets as USA, and so they also see Fun Run so high on the charts. That there are so many from Norway is not surprising.

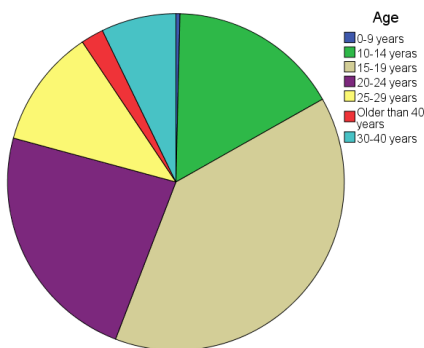


Country	N	Percent
USA	626	80.4%
Puerto Rico	56	7.2%
Norway	22	2.8%
Canada	20	2.6%
Germany	6	0.8%

Figure 9.2: Distribution of countries from where players come from. Only countries with more than 0.5% are shown.

Table 9.2: Distribution of countries from where players come from. Only countries with more than 0.5% are shown.

The age distribution of the players are shown in Figure 9.3 and Table 9.3. The majority of players are teenagers or in their early twenties. Facebook have an age limit saying that you must be 13 years old to make an account. The game also has an age limit of 9+ years on the Apple App Store. This must be taken into consideration when looking at these numbers.



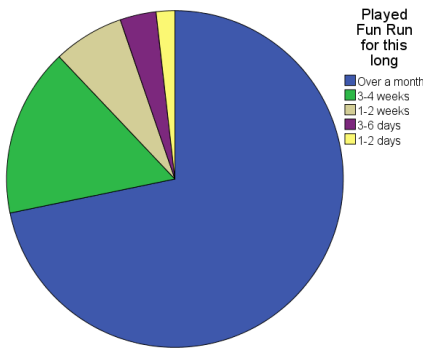
Age	N	Percent
0-9 years	3	0.4%
10-14 years	128	16.4%
15-19 years	304	39.0%
20-24 years	182	23.4%
25-29 years	89	11.4%
30-40 years	56	7.2%
Older than 40 years	17	2.2%

Figure 9.3: Age distribution of the players.

Table 9.3: Age distribution of the players.

Figure 9.4 and Table 9.4 shows a distribution of how long the players have been playing Fun Run. The majority of the answers were given by people who have

played for over a month.

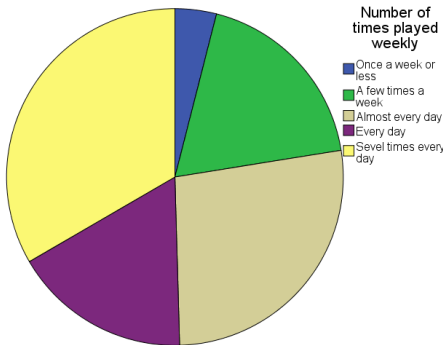


Play time	N	Percent
Over a month	559	71.8%
3-4 weeks	126	16.2%
1-2 weeks	53	6.8%
3-6 days	27	3.5%
1-2 days	14	1.8%

Figure 9.4: Distribution of how long players have been playing Fun Run.

Table 9.4: Distribution of how long players have been playing Fun Run.

The amount of time the players use playing Fun Run is shown in Figure 9.5 and 9.6, and Table 9.5 and 9.6. The first pair show how often they play, and the second how long (how many games) they play each time they play. As can be seen, most player play fairly often, almost every day or more. Additionally, when they play, they play several games in a row.



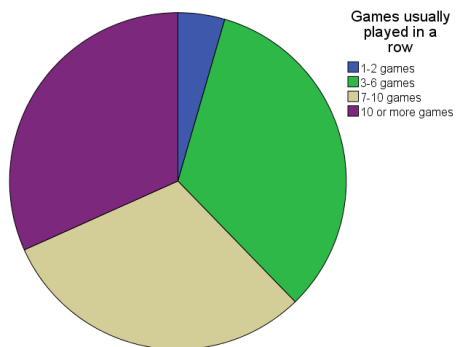
Weekly play	N	Percent
Once a week or less	31	4.0%
A few times a week	144	18.5%
Almost every day	211	27.1%
Every day	133	17.1%
Several times every day	260	33.4%

Figure 9.5: Distribution of how often the players play Fun Run.

Table 9.5: Distribution of how often the players play Fun Run.

The amount of players who have purchased coins, and how much they have purchased, are shown in Figure 9.7 and Table 9.7. Only a little over 10% of the players who answered the survey have purchased coins. The distribution of who have purchased coins are investigated further in Section 9.3.

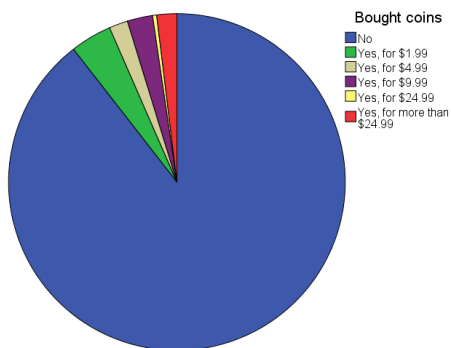
Table 9.8 and 9.9 show the results of questions where the players could cross of more than one option. Because of this, the sum of the answers exceeds the number of players that answered the survey.



Games in a row	N	Percent
1-2 games	35	4.5%
3-6 games	259	33.2%
7-10 games	238	30.6%
10 or more games	247	31.7%

Figure 9.6: Distribution of many games are usually played in a row.

Table 9.6: Distribution of many games are usually played in a row.



Bought coins	N	Percent
No	697	89.5%
Yes, for \$1.99	31	4.0%
Yes, for \$4.99	14	1.8%
Yes, for \$9.99	19	2.4%
Yes, for \$24.99	3	0.4%
Yes, for more than \$24.99	15	1.9%

Figure 9.7: Distribution of players purchasing coins.

Table 9.7: Distribution of players purchasing coins.

Table 9.8 shows where people have heard about Fun Run. It is clear that the most important source is friends and family. Many players also found Fun Run in the application store. Social media is also an important source.

Source	N	Percent
Facebook	144	18.5%
Twitter	50	6.4%
Instagram	45	5.8%
From friends/family outside of school/work and social media	350	44.9%
At school/work	185	23.7%
Found it in the App store/Play store	184	23.6%

Table 9.8: Where players heard about Fun Run.

In Table 9.9, the various features Fun Run have are listed, along with how popular they are. The two most important features of Fun Run is that the players can play against their friends, and that it is fast and easy to pick up.

Feature	N	Percent
That you can play against friends	605	77.7%
That it is fast and easy to pick up	468	60.1%
That you can purchase new skins	224	28.8%
The ranking list	207	26.6%
The graphics/animations	267	34.2%

Table 9.9: Popular features of Fun Run.

Table 9.10 - 9.14 show the results of the questions where the players had to give a score from 1 to 5. The answers have been averaged out, and the mean and standard deviation is showed in the tables.

Table 9.10 show what factors the players think are important when deciding whether or not to try a new mobile game. Recommendations from friends is the most important factor. As suggested by the advisor, the similar values was tested for statistical significance. This was done using a Wilcoxon Signed Ranks test. For the difference to be statistically significant, the Wilcoxon test should return a value no larger than 0.050 . The results showed that the difference between *business model* and *price* is significant, with a value of 0.000 , while the difference between *price* and *ranking*, and *ranking* and *reviews/rating* is insignificant, return values of 0.464 and 0.057 , respectively. This means that the business model of the game is more important that the other factors, but it can not be said that one of the other factors are more important than the others.

When it comes to features that are important in order to keep players playing a game for longer periods of time, Table 9.11 shows that the most important is leveling up. That is, people want to become more powerful, and unlock more abilities, the more they play. Unlockable content and regular updates can not be said to be significantly different, according to the Wilcoxon test which gives a value

Factor	Mean	Std. Deviation
Recommendations	4.19	1.065
Business model	3.79	1.478
Price	3.71	1.516
Ranking	3.67	1.329
Reviews/rating	3.58	1.418

Table 9.10: Factors that are important when deciding whether to try a game or not. Higher is more important.

of 0.987 , and achievement is somewhat less important.

Feature	Mean	Std. Deviation
Leveling up	4.28	1.081
Unlockable content	4.10	1.141
Updates	4.09	1.180
Achievements	3.91	1.245

Table 9.11: Features that are important to keep people playing. Higher is more important.

The most common opponents the players play against are shown in Table 9.12. As can be seen, most people play against random opponents, in quick play.

Opponent	Mean	Std. Deviation
Random opponents	4.48	0.903
Friends	3.52	1.331
Family	2.46	1.501
Random opponents in friend list	1.96	1.362

Table 9.12: The opponents that the players are usually playing against. Higher is more often.

Table 9.13 shows in which situations most people play Fun Run. The most common situation is to play at home, but many also play while waiting. This can be seen in Figure 8.3, which shows that people play a lot during the holidays, when they are more at home.

Regarding what business model is preferred amongst the players who answered the survey, none of them are very popular. However, as can be seen in Table 9.14, the least unpopular model is based on free games with ads. In-app purchases comes next, with paying for advantages and paying for cosmetic changes scoring about the same. Actually paying for the game comes second to last, while paying to get all the content of a game is the least popular business model.

The Wilcoxon test shows that the difference between paying for advantages and paying for cosmetic changes is not statistical significant, with a value of 0.211 . The difference between the other values are significant.

Situation	Mean	Std. Deviation
At home	4.43	0.969
When waiting	4.02	1.167
When traveling	3.02	1.490
At school/work	2.84	1.510
At parties	2.01	1.317

Table 9.13: The situations where the players usually play Fun Run. Higher is more often.

Business model	Mean	Std. Deviation
Pay for advantages	2.59	1.454
Pay for cosmetic changes	2.65	1.419
Pay for the game	2.14	1.306
Ads	2.83	1.450
Pay for all the content	2.05	1.448

Table 9.14: How the players feel about different business models for games. Higher is more popular.

9.3 Additional Findings

In addition to the results put forth in Section 9.2, some additional findings can be made from the answers in the survey. These findings are described in this section.

Figure 9.8 shows that if the players are grouped by which device they play on, iDevice users spend more money on coins than Android users. This is also shown clearly in Figure 8.5.

Figure 9.9 shows, not surprisingly, that the people who play most often also play the most games in a row.

Figure 9.10 and 9.11 shows that both Android and iDevice users spend about the same amount of time in the game. They also show that players who play on both types of devices play more frequently, but still for about the same number of games each time.

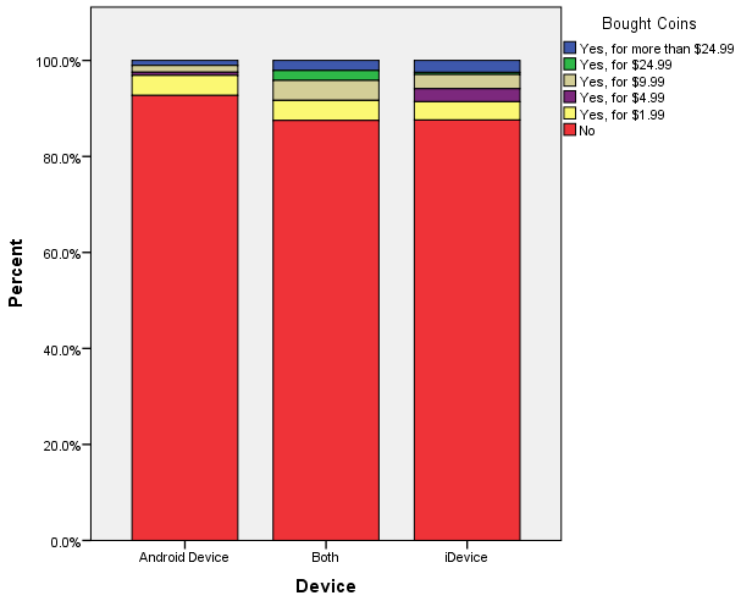


Figure 9.8: Coins bought by device.

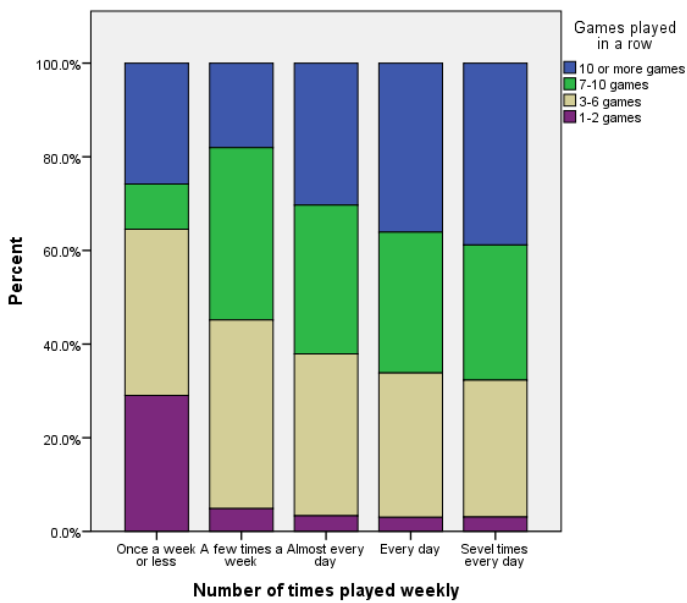


Figure 9.9: How often, and for how long, players play Fun Run.

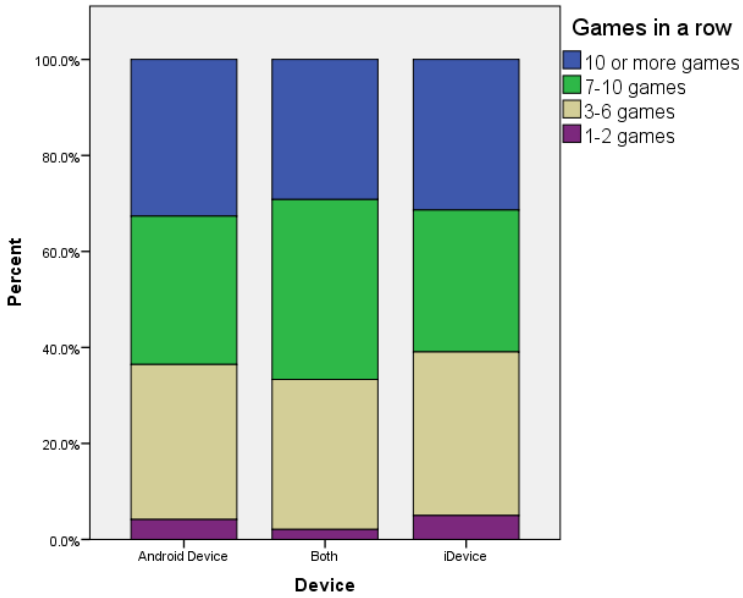


Figure 9.10: Games played in row, by device.

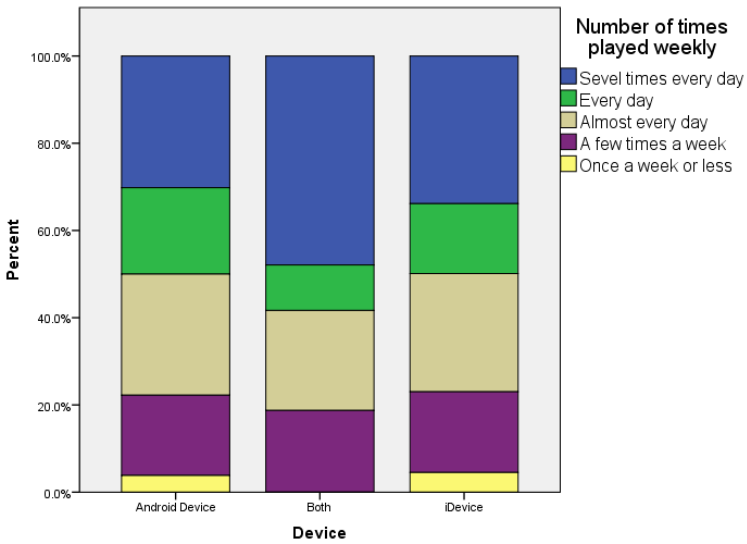


Figure 9.11: Frequency of play sessions, by device.

Chapter 10

Interviews

To get a picture of what the people behind Fun Run think about the game, their success and how it happened, interviews were performed in March 2013. Both a member of the developer (Erlend B. Haugsdal) and support team (Matthew Guise) was interviewed, and the questions and answers can be found in Section 10.1 and 5.3 respectively.

10.1 Interview With Developers

How did you come up with the idea for Fun Run?

We have seen that multiplayer games have done it really well before, for example Wordfeud, Draw Something and Ruzzle. We wanted to create something that hadn't been made before, and as all the examples mentioned are turn-based, we thought a real time multiplayer game sounded like a good idea. Additionally, based on the experiences from our previous game, Drop the Box, we learned that games should have a social aspect to increase the chances of it becoming a hit.

We decided to make a 2D racing game because we have experience making 2D games, and frankly, that is a lot easier to do. We also wanted to play on people's competitive sides, and thought that a racing game would be a good way to do that.

What was your initial goals with Fun Run?

We hadn't really set any concrete goals before the launch of the game. We hoped to earn enough money from the in-app purchases to run the servers, and cover any additional costs. If we would end up making more money than we spent, that would be an added bonus.

That being said, we had early decided that we wanted to focus more on getting people to like our game, than to earn money. We hoped to get as many downloads as possible, hopefully more than from Drop the Box, but we never dared hope for these numbers that we have achieved.

What was the biggest challenges when creating Fun Run?

There are a lot of challenges when creating a game like this. Since we had never made a multiplayer game before, that whole part, with the servers and the communication between them and the players, was a big challenge.

Another thing was to actually dare to try something this complex, as we had very little experience with back-end architecture.

This was also the first project we have done with such a large team (6 persons), and it was quite challenging to find the people needed and coordinate the team.

What was the biggest challenges after releasing Fun Run?

Since Fun Run is a multiplayer game, it is important to get a lot of people to play it, so that those who do play it have someone to play against. This was a challenge in the beginning, as very few people played the game, they had to wait a long time to find someone to play against (a race does not start until there is at least two players in the same race). This was first solved by having us and our friends continuously playing the game, and jump into any race where another player was waiting. We soon found out that this was not a lasting solution, so we made bots, or computer players, who could play against other players. As more players starting playing, this problem disappeared.

When the game suddenly became popular in USA, we ran into another problem, namely scaling. As we had not anticipated the game to become so popular, our back end was not built to scale to that many players, and for a time, we had to work night and day to prevent the servers from becoming overloaded the next day.

Why did you choose the business model in-app purchases?

There are several reasons as to why we chose to have a free game with in-game purchases. The main reason was that it was important to us to get a lot of players, and quickly, which would be harder to achieve with a paid application. We also play a lot of games ourselves, and do not like games that are filled with ads, so we tried to avoid using that as a business model. We have later put some ads in the game, but in a very non-intrusive way. The ad is only shown once every 5 hours, and only after a player have played a game.

Since the players are playing as an avatar, it is a good idea to let them customize their own avatar, so as to differentiate themselves from the other players. This thought fits very well with the in-app purchase model, as the players can buy accessories to their character.

Do you think Fun Run could have become as successful if you have used another business model? Could you have made more money? Why haven't you?

I don't think Fun Run could have done it any better using another business model. The in-app purchase model fits this game perfectly.

We could probably have made more money if we had implemented the in-app purchase differently. As it is now, the only things that can be bought in the game is cosmetic changes to your avatar. In many other games, players can buy items

or traits that give them advantages over other players, or help them in the game in some way; so called "pay-to-win". If we had added this to the game, for examples that players could pay to run faster or recuperate quicker after being killed, we might have earned more money for a little while, but in the long run, we don't think it would pay off. The reason for this is that many gamers, including us, thinks it is unfair to be able to pay to get advantages. So we decided to avoid that in order to not alienate those players and possibly lose downloads.

Whether or not *Fun Run* could have become more successful if we had "pay-to-win" is hard to say, and depends on how you would define a success. We like to think of success as having a lot of users who like our product, rather than how much money we have made.

What do you feel you have done right with Fun Run?

Its hard to point at specific things that we have done right, as there is no universal true answer to this. However, considering how well the game have performed, it is clear that we must have done something right.

In hindsight, it has turned out that we made the right decision on many topics. For example regarding how and when players play mobile games. The game should be quick and easy to pick up, and you shouldn't have to play it for a long time to get something out of it. We made sure that you do not have to spend a lot of time in the menus when starting the game; two clicks and you are in a race. We saw how important this is when we removed the mandatory password and email address for creating accounts; over 10% more people who downloaded the game actually created and account after this. Additionally, the controls are very easy to learn, there is only two buttons; one for jumping and one for power ups. This makes sure everyone can play the game. We also tried to make the graphics of the game appeal to both boys and girls.

As I said in the last question, we also think we made the right decision with the business model.

What do you feel you could have done better with Fun Run?

As we are very young company with little experience, there is of course some things that could have been done better. The structuring of the team, having set clearer responsibilities from the beginning, and the quality of the code are some things that comes to mind. These are relatively minor things in the big pictures, but it is honestly the only things I can think of, as I think we mostly have done things quite well. We are happy with our product.

Why do you think Fun Run has become such a success? How did media attention and social media affect this?

I think media has played an important part in our success. In Norway, we got quite a bit of media attention after winning the awards at Norwegian Game Awards, which helped us get quite high on the lists here. In USA, on the other hand, we received very little to none media attention. However, thanks to social media channels like Facebook, Twitter and Instagram, a lot of people got to hear about Fun

Run.

We held a competition through the "Message of the day" feature (a feature where we can post updates and news which will be shown in the menu in Fun Run), where we told people to write on Twitter and Instagram and use the tag "#funrun" along with a message to get a chance to win 10 000 in-game coins. The day after this, we noticed that Fun Run was starting to grow in popularity in USA. More and more people started using the tag and at one point we was in fact trending world wide on Twitter.

We noticed that most people who was tagging us added a message saying something like "Add me" and then their username in Fun Run. We think that the reason for this is that want to play against friends in the game, and since we did not implement the option to play against one or two friends, and have a random player take the last spots, people want to have a lot of friends so that they can use them to fill those spots. It is more fun to play against three others than one or two. This is a feature that we had planned to add, but seeing how much free publicity we got from that, it was kind of a lucky mistake that we didn't.

What is the most important thing to do right in order to get lots of downloads?

Make a good product. A game should be fun and engaging. When creating a game, it should be something new, not a copy of something that already exists. Although there are many copies of popular games that have done it quite well, that is not the way to go, and certainly now what we want to do. Be innovative!

How do you feel about Android compared to iPhone? What about Windows Phone?

When we made Fun Run, it was important to us that both Android and iPhone owners would get to play the game. The reason for this is of course to make the game available to as many as possible, but also to make sure that friends could play with each other even though they do not have phones with the same operating system.

The framework we used, Corona, also made it very easy to make the game available to both Android and iPhone, as the same code compiles to both. However, considering how little market share is held by Windows Phone, and that it is not supported by Corona, we chose not to make a Windows Phone version yet.

10.2 Interview With Support

Roughly how many support requests are Dirtybit getting each day, on average? How many was there at the busiest?

I would say we get upwards to a hundred support requests each day at the moment. This includes new requests and follow-ups from older requests. At the busiest, we probably got over 200 new requests each day. I think this was in January and February.

How does the current popularity of the game affect the amount of support request you get?

How many people are playing the game, and how many new players there are, greatly affects the amount of work we have to do with support. Particularly when there are a lot of new players, there is a lot to do. This is typically when the game is very popular somewhere.

What is the major issues that the users are complaining about or need help with?

There are several issues that the players are complaining about. There is of course various bugs in the game, but the biggest issues are features outside of the actual game, like losing access to their account, disconnecting or wanting to change their username (this is currently not possible). These three issues, I think, are the biggest ones.

Is there something that people have complained about that has been fixed by the development team as a result of the complaints? Did you see any consequences of that?

There was a bug where players got randomly logged out of their accounts with a message saying that they had been logged in somewhere else. This was a problem for several reasons, but mainly because many people did not sign up with an email and a password, only a username. Because of this, they were unable to sign in again.

When they fixed this issue, we of course noticed a decline in people complaining about this, which led to less work for us as we didn't have to manually add email addresses to accounts all the time.

Is there a feature that a lot of people are asking for?

People are generally asking for more content, like more avatars, more maps, more power-ups and so forth. However, the feature most people are asking for is the ability to better control their account, that is, change their username, email address and the option to delete their account (this have to be done manually by us now, which takes a lot of time).

Is there something that people are saying that they like when communicating with you?

People often write to us to say that they love the game. The one thing that they mention when they do this is that they get to play with, and defeat, their friends. This seems to be a big reason as to why people like Fun Run.

Chapter 11

Discussion

In this chapter, the results of the case study will be discussed in light of the theory from the pre-study. Additionally, in Section 11.1, a few other mobile games that have achieved success will be looked at, as well as Dirtybits first game, Drop the Box. The findings of this report is discussed and summarized in Section 11.2. In Section 11.3 will the threats to the internal and external validity of the case study be discussed.

11.1 Other Games

In this section, popular games, both on mobile platforms and others. In Section 11.1.1, other popular games are examined to try and see what these games have done right, and whether or not there is anything to learn from this, primarily with respect to choice and implementation of business models. In Section 11.1.2, Dirtybits first game, Drop the Box, and what the developers learned from, will be examined.

11.1.1 Other Popular Games

Farmville is a social network game created by *Zynga*, played on Facebook. This was for a long while the most popular Facebook game[15], and is by many the first game that comes to mind when thinking about casual, social games. Because of this, Farmville will be used as the example of this genre here.

Farmville is a game that is very easy to play. It is a persistent game, so the time in the game world runs regardless of whether or not the player is currently playing the game. However, to perform as well as possible in the game, the players have to spend as much time as possible in the game, even though there are very little action happening. Basically, many players pay to not be bored when they play the game. To get players to do this, Zynga have put a lot of effort into creating a good interest curve, described in Section 7.3, for the game, which draws the players forward by

giving them small rewards for completing simple tasks, and always giving them more stuff to do.

Farmville also rewards players for playing with their friends, as players can give each other gifts in the game, giving them advantages. These advantages can also be bought for money, through in-game purchases.

Hayday and Clash of Clans are iPhone/iPad games made by *Supercell* following the recipe of Farmville. These games have become huge hits, and are generating several million dollars every day in revenue through in-app purchases[16]. This is the most profitable mobile games at the moment (April 2013), and shows how well the in-app purchase business model can do, if implemented optimally.

These games, along with many other successful games built on the same business model, shows that the in-app purchase model is one of the best, if not the best, business model for earning money on mobile games.

Angry Birds is a casual arcade/puzzle game made by *Rovio Entertainment*. This was one of the first really big games for the mobile platforms, coming out to iPhone in December 2009, and was sold for \$0.99. When later it was released for Android, it was free, but had ads in the game. Some of the reason for this can be seen in Figure 8.5 and 9.8, which indicates that iPhone owners like to spend more money on apps than Android owners.

Angry Birds have later earned a lot of money on merchandising; in 2011 30% of Rovios revenue came from merchandising[17].

Wordfeud is a Scrabble-clone made by the Norwegian *Håkon Bertheussen*. It is still the most known Norwegian app in Norway, although Fun Run is probably more known internationally. Wordfeud is a turn-based game where players play against either friends or strangers. Several other Scrabble clones are available at the app stores, including Words with Friends released by Zynga, which is more popular internationally.

Wordfeud uses the freemium business model, where the free version of the game have ads and is missing some features not vital to the game. The premium version of the game can be bought for \$2.99.

Seeing as this game is turn-based, it has a slower pace than Fun Run. The players have 72 hours to make a move before they lose the game. Since the game is also challenging on a more intellectual level than Fun Run, it might appeal more to adult players.

Wordfeud has a close integration with Facebook. You can use Facebook to find friends who also have the game, so that you can play with them, or friends who do not have the game, and invite them to try the game. It is also possible to post the results of games to Facebook. This might be part of the reason to why Wordfeud have over 628 000 likes on their Facebook page. This is almost 10 times as many as Fun Run have, despite having fewer users. Another reason for this is that people might find themselves more invested in a game in which it takes several days to complete one round, than in a game which is over in a few minutes. The different

target audiences might also be relevant to this, as well as the fact that Wordfeud is an older game than Fun Run.

Candy Crush Saga Candy Crush Saga is a variation of the classic game bejeweled, where the task is to pair the same types of candy with each other by swapping two and two neighbor pieces of candy in a grid. The game is available for Android and iPhone, as well as on Facebook. Candy Crush Saga was released after while after Fun Run, in November 2012, and have achieved great commercial success in the few months since then.

A big part of the reasons for the success of this game is its close integration with Facebook, leading to an incredible virality[18]. Players progress is automatically posted to Facebook, serving to make the players network aware of Candy Crush Saga and a personal endorsement for the game. The game also shows the progress of the players Facebook friends in the game, serving to promote competition between friends, despite it being a single player game.

The game is addictive due to its level system, giving players solid, attainable goals. The game is also easy to learn and play.

Candy Crush Saga has an incredible devious monetization scheme. Players have a certain amounts of lives when playing, and they lose one life each time they fail a level. The lives replenishes by one life every half hour, and when the players are out of lives, they have to wait to play more. That is, unless they either pay to get their lives back, or ask their Facebook friends to give them a new life. Additionally, after a certain amount of levels, the players must either pay to unlock more levels, or ask their friends on Facebook for a "ticket" to unlock them. Various other perks and advantages can also be bought. This way to almost force the players to either spend money, or promote the game on Facebook have turned out to be very successful, although to some, quite annoying. The creators of Candy Crush Saga, King, claims that 30% of their users have spent money on the game[18].

Lastly, the progress of the players syncs across platforms, so if they run out of lives on their mobile, they can continue to play on Facebook. This promotes cross-platform play, and increases customer sessions.

11.1.2 Drop the Box

Drop the Box was the first game made by Dirtybit. This is a single player, physics based puzzle game, based on the freemium business model, where the free version have a limited number of levels to play, but no ads.

The task in the game is to make use of walls, trampolines, conveyor belts, fans and magnets to guide various boxes from a tube to one or more other tubes, depending on the type of box. A screenshot of the game is shown in Figure 11.1

The free version of Drop the Box has been downloaded about 208 000 times, and the paid version, which costs \$1, have been downloaded about 1000 times. The free version have an average rating of 4.33 and the paid version 4.61 (on Android). This goes to show that a good rating does not always lead to lots of downloads.

Even though the Dirtybit developers was quite happy with the results of this game when they launched it, it is nothing compared to the results of Fun Run.

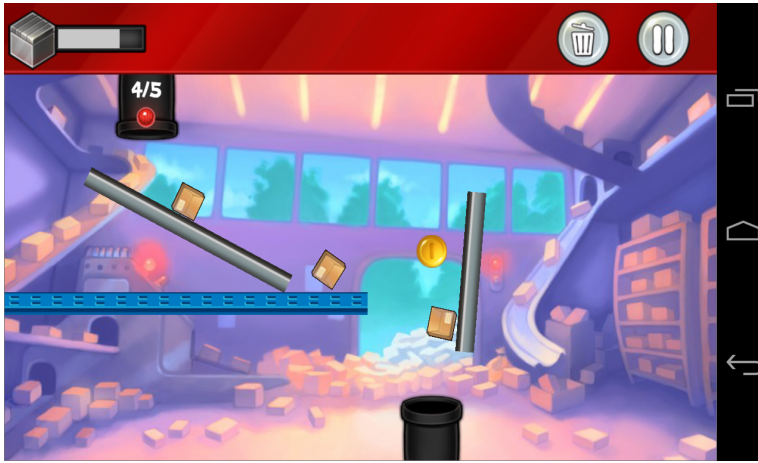


Figure 11.1: One of the first levels of Drop the box

There are probably several reasons for this. The business model chosen for Drop the Box meant that the free version only acted as demo for the paid version. They earned no money from the free version of the game, since it had no ads. Considering the wide gap between number of downloads for the free and paid version (only 0.4% bought the game), it can seem like people got tired of the game after trying the levels included in the free version, and thus had no incentive to pay for the premium version.

Drop the Box is also a lot harder to play. The action of placing and moving the walls and conveyor belts is quite complex, and not as easy to understand as the controls in Fun Run. Drop the Box also lacks the multiplayer part that Fun Run and many other popular games have. According to the survey, Table 9.9, this is a really important feature of Fun Run.

11.2 Summary

There is a lot of different factors to consider when looking at why a certain game became a success. The platform the game is played on, the business model of the game, and what kind of game it is, are all very important. When creating a mobile game, there are several aspects that require attention and awareness, that games on other platforms does not.

One of the most obvious things is the way the application and games are distributed, that is, through the application stores, and how these stores work. As described further in Section 4, the applications with the most downloads are displayed up front in the app stores for both Android and iPhone. This leads to a powerful positive feedback, as described in Section 7.1. To get a game to the front page of these stores is in itself a measure of success, but it also leads to a lot of exposure and many more downloads.

This is exactly what Fun Run did. They made it to the number one spot on the iPhone App Store, and from there the number of downloads remained very high for a long while. The interesting part is how they managed to reach this position.

As can be seen in Figure 8.1, the number of downloads was quite low for a long time, before it slowly started increasing around November 10th. Then, on November 27th, the number of downloads suddenly started increasing substantially. This is again something that can partly be explained by positive feedback. Somewhat related to this is the virality of the game. Virality is described in Section 7.2.

Fun Run turned out to have extremely high virality, as is shown in Section 8.5.2 and 8.5.3. A lot of people talked about Fun Run online, in social media, which again caused more people to try it out. This is displayed in Table 9.8, which showed that roughly 30% of the players that answered the survey had heard about Fun Run through social media. Additionally, almost 45% of the players said that they heard about it through friends or family outside of school/work and social media, which is important as this, according to Table 9.10, is the most important factor when deciding on trying a game. The fact that, according to Table 9.9, the most popular feature in Fun Run is that you can play against friends explains why people are so eager to get their friends to try the game.

Another popular feature according to Table 9.9 is that the game is so fast and easy to pick up. This is also pointed out by developer Erlend Haugsdal: "*The game should be quick and easy to pick up, and you shouldn't have to play it for a long time to get something out of it. We made sure that you do not have to spend a lot of time in the menus when starting the game; two clicks and you are in a race*". Game design is discussed in Section 7.3, and it is clear that Fun Run does a lot of things right in this regard. It is so easy to control that it can be played by virtually anyone, the game sessions can be very short, and the game have received several updates during its time on the market.

One aspect of Fun Run that have not received as much praise as the rest of the game is the graphics and animations. As can be seen in Section 8.5.1, GameTrailers claimed that the game looked like a "high school project", and CNET says that the game cannot decide if it is for aimed for kids or adult, with the cute characters and the gory death animations. Additionally, according to the survey in Table 9.9, graphics and animations was the least popular feature of the game. This shows that having a great looking graphics in a game is not vital to achieve success, but also that this is an area that can be improved by Dirtybit.

Even though the each race only takes about a minute to finish, many people keep playing the game for longer periods, as can be seen from the survey in Table 9.6. This may be caused by the intrinsic interest curve of a this type of games, which naturally gets more exiting the closer the players get to the finish line, and with interest spikes when ever the players pick up a power-up box, and valleys in between. The interest curve is described in Section 7.3.1.

This type of game also seem to fit well with the popular categories, as it can be said to fall under the *family* category (can be played by people of all ages). According to Section 6, this is one of categories that engages the players the most, in terms of time spent in the game each session.

Another important aspect is the business model Dirtybit chose for Fun Run. By making the game free, it is easier to get a lot of downloads, and by not having ads and not making it mandatory to buy things in the game to succeed, they made it easier for people to recommend the game to their friends. This is discussed further in Chapter 5. The business model of the game is the second most important factor when deciding to try a game, according to Table 9.10, and according to Table 9.14 one of the least unpopular monetization schemes.

There are many different platforms for mobile games, as discussed in Chapter 4. Fun Run was released for Android and iPhone/iPad, effectively covering almost the entire market. This poses some challenges, for example the varying time it takes to release new content to the markets and different programming languages. Most of these challenges can, however, be solved by using a framework like Corona, and this is what Dirtybit did for Fun Run, as described in Chapter 3.

11.3 Threat to Validity

Yin[5] explains that there are commonly used four tests to establish the quality of any empirical study. These are tests for *construct validity*, *internal validity*, *external validity* and *reliability*. These tests are explained and applied to this case study below.

Construct validity

The construct validity test is used for identifying correct operational measures for the concepts being studied. This means to determine what specific concepts the study will examine, as well as identifying what values match these concepts. Yin[5] suggests three tactics for achieving this: use multiple sources of evidence, establish chain of evidence, and have key informants review the draft case study report.

For this project, the concept have been clearly defined from beginning; the success of mobile games. There have also been determined several values to measure this success; the number of downloads, ranking placement and revenue.

Additionally, several distinct sources has been utilized; the survey, interviews, and data gathered from Distimo, Flurry, Facebook, and the games database. Key informant, and CEO of DirtyBit, Erlend Haugsdal have also reviewed a draft of this report, and approved the validity of the content.

Internal validity

The internal validity is mainly a concern for explanatory case studies, when an investigator is trying to explain how and why certain events led to certain outcomes. Additionally, the validity of any inferred conclusion can be questioned.

Tactics for passing this test includes pattern matching, explanation building, addressing rival explanations and using logic models.

In this case, another threat to the internal validity is the fact that the author of this report is employed by DirtyBit, as support. To not let this affect the results of the case study, another support employee has been interviewed, in Section 10.2, and so that any opinions from a support point of view are taken based on his answers. Additionally, any conclusions that are drawn are based on the data from the case study, and not from personal opinions.

External validity

This test deals with the problem of knowing whether a study's findings are generalizable beyond the immediate case study. That is, knowing whether the results from a case study can be applied to similar cases. Yin[5] suggests two methods for assuring external validity; use theory in single-case studies and use replication logic in multiple-case studies.

Considering that this case study is a single-case study, it is hard to use test for how general the results are. However, as much of the conclusion is based on a survey, there can be made a point about it having some statistical generalization.

There has also been made some comparisons to other mobile games which has achieved great success, so the results are somewhat generalizable. However, further investigation, testing with other cases, would be required to improve this.

This case study is on mobile games, and does not encompass games on other platforms. Because of this, it does not have external validity in regards to those games. Additionally, the study gives a picture of how the mobile games market looks right now, and considering how this market is still evolving, it might not be applicable in the future.

Reliability

The goal of this test is to ensure that if a later investigator followed the same procedures as described by an earlier investigator and conducted the same case study all over again, the later investigator should arrive at the same findings and conclusions.

To ensure this, all the data from the survey, sound recordings of the interviews, and the data from the database, Flurry and Distimo are saved. The data from Facebook is also saved, but unfortunately, the data from Twitter is unavailable. However, if an investigator did the same case study again at a later time, it is unlikely that he would get the same results, due to the fact that the mobile app market is still evolving, and it will probably not look the same in the future as it does now.

Chapter 12

Conclusion and Further Work

In this chapter, conclusions will be drawn on the basis of the information gathered in the pre-study, in Part 2, and the case study, in Part 3. These conclusions will aim to answer the research questions posed in Section 1.2. This is done in Section 12.1.

In Section 12.2, some suggestions for what Dirtybit should consider doing in the future is posed, as well as possible further work on researching the mobile application market.

12.1 Conclusion

How did Fun Run become so successful?

Fun Run did many things right in order to become as successful as it did. The choice of business model, in-app purchase, was a major part of this, as was the fact that it is a multiplayer game. These factors lead to a lot of people getting into the game; the threshold for trying the game is low, as the game is free to download, and the players who tried it wanted to play with their friends, so they got them to download it as well. It also helped that Dirtybit on several occasions encouraged the players to post about Fun Run on social media.

Considering that the game is so easy to play, quick to get into, and available on the two biggest mobile platforms, almost anyone who heard of the game and wanted to try it, could easily do that. This lowered the threshold for people trying the game even further.

Dirtybit have also done a good job providing updates and adding content to Fun Run. They have arranged polls on Facebook, asking the users what they want added, and then added the most popular feature or avatar. The data graphs show that the popularity and usage of Fun Run increases after new updates are released, so this is very important.

The fact that Dirtybit managed to keep up with the explosive growth in players, and kept the servers from going down when it was at the most critical, is also an very important point to make. This was in a large part possible due to Amazon Web Services, as there was very easy to add more servers when that was needed. If the game had been unavailable for longer periods of time just as it was about to reach the top of the lists in USA, it is possible that it might never have happened. The timing of this explosive growth was also very fortunate for Dirtybit, seeing as how they ended up on the top of the lists just as the holidays started, and a lot of people got new phones they wanted to try out, and had a lot of time to play games.

Lastly, Fun Run is a real time multiplayer racing game, and there are still very few good real time multiplayer games available on mobile devices, as the norm is to make turn based multiplayer games. Because of this, Fun Run had very few games that could compare to what it had to offer. This is something that also have been noticed by Google, who, at their keynote speech at Google IO 2013[4], announced that they are releasing a framework called Google Play Services that will make it easier for developers to do much of what Dirtybit have done with Fun Run. That is, have an account that is available from various devices, support for real-time multiplayer gaming, leaderboards, and so forth.

What factors are important for a mobile game to achieve success?

For a game to achieve success in the mobile game market, it is vital to get a large number of downloads. The reason for this is the way the mobile app markets are structured, where the most downloaded applications are at the top of the lists, and shown at the front page, while applications that are downloaded less are virtually impossible to find unless you are actively searching for it. Once an application has reached the top of the charts, the positive feedback effects takes place, and creates a snowballing effect that in many cases provides a huge increase in downloads.

The hard thing to do is to get enough downloads to reach the top charts in the first place. One strategy to achieve this is to go all out with marketing of the game right as it is launched, as there are separate top lists for *new* applications, which are probably more easy to climb.

Regardless, there are certain steps developers can take to increase the chance of their mobile game becoming a hit. One of the most important factors are the choice of business model. The in-app purchase business model seems to be the best choice for mobile games. There are several reasons for this, the most important being that the threshold for downloading free applications are a lot lower than paid apps, which causes them to rise further on the top charts. However, this approach does often require more planning, as it is required to keep the users playing for a longer time in order to earn money from them.

To get people to try an application, there are certain strategies that work better than others. It is obviously a huge advantage to be high on the ranking lists, but other things also help. An effective strategy is to get the players to do the marketing, either face-to-face, or through social media like Facebook or Twitter. This can be done through arranging a competition, or facilitate the users to post

about the game, for example letting them post high scores or results, to brag about it. It is also important that the game is available to a lot of player, both when it comes to devices, but also skill level required to play the game. This is extremely important, as many potential players can be lost if the game is either too hard to get into, or too hard to play.

If an application is using the in-app purchase business model, it is important to keep the user playing the game for longer time, compared to if they only pay once to get the app. There are many ways to keep people playing the game; creating a feeling of progress through levels, unlockable content, achievements, competition, or exploration, is a often a good idea. As is providing new content to the game periodically.

It is also important to think about what mobile platform to develop a game for, as there are some differences between the various platforms. Obviously, the more platforms a game is available on, the better it is, as the customer base increases. However, if only one platform can be chosen, iOS appears to be the best choice, as least when it comes to possible revenue. If the threshold for releasing a game to iOS becomes too high, Android is a good and easier alternative to get started.

How does the choice of a business model affect the popularity of a mobile game?

The choice of a business model, or monetization method, and how it is implemented, can potentially have a huge impact on the popularity of a mobile game. As mentioned above, a free game is likely to get more downloads easier, compared to a similar, or better, paid game. A paid game that is not already famous, or well known, will have a very hard time getting any traction in the app market, as people are very weary of buying a game where they do not know what they get. A reason for this is the huge number of games released each day, providing really tough competition.

The way around this obstacle is to use another business model. Both the freemium model, the in-app purchase model, and the ads model can overcome this obstacle, and provide an easier entrance to the market.

Not earning money from paid applications also have other benefits. As mentioned, it is easier to get more downloads, but it also leads to not having to worry about piracy. Even though you do not earn money from every user, with enough users, some of which spend a lot of money, it more than makes up for it.

What are the differences between creating mobile games, and games on other platforms?

There are several differences between creating a mobile game and a game on another platform, say for Windows or a video game console.

The number one difference is the ease of which a developer can distribute a game to virtually anyone using the platform the game is made for. This is not possible on any other platforms, without being approved by the distributor, and paying large fees. Even though Apple have an approval process, anyone with some programming experience can make an application and afford to have it approved.

This, of course, leads to a lot of applications being released on the markets, so there is a huge competition for the customer attention, and it is easy to drown in the abundance of other applications. Because of this, it is very important to make a good, available, product, which stands out from other, similar apps. This can be done either through making a new and innovative game, or improve on some game that has already achieved success. It is also more important to keep updating the game, to keep it relevant for a longer period of time.

When creating a game, it is also of course important to think about the limitations and restrictions applying to mobile games; smaller screens, limited hardware (this used to be a bigger issue), the touch interface, and the platforms ecosystems. All of this is unique to mobile games, and needs to be taken into consideration when creating these games.

12.2 Suggestions and Further Work

In this section, some suggestions will be posed, both regarding actions Dirtybit can consider in order to improve Fun Run, and regarding further work in this subject. This is done in Section 12.2.1 and 12.2.2 respectively.

12.2.1 Suggestions for Dirtybit

Based on the findings in this report, there are several steps Dirtybit can take in order to improve Fun Run in various ways.

Considering the importance of keeping the players playing the game, and spending money on it, for longer, there are some features that can be implemented in order to increase user retention. Adding either the ability to get experience points and level up the character in the game, or some sort of unlockable content to the game, or both, might be a good idea in order to achieve this.

Doing this, players might find themselves wanting to play for longer, as they get the excitement of increasing in power, as well as the excitement from exploration and finding new stuff, to keep them going. Dirtybit should also consider offering some more things for sale, other than cosmetic changes, seeing as players does not object particularly to this, according to the survey. As long as no one gets any unfair advantages, this should be considered.

Some attempts at this has already been made by Dirtybit, in adding *daily challenges*. These are challenges that include winning a number of times, getting a certain amount of kills or deaths, increase in rating, and so forth, in one day. Doing this gives a reward consisting of some coins (more for harder challenges). It would be a good idea for Dirtybit to monitor the impact this has on user retention.

At the same time as daily challenges, an option to watch a video ad to earn some money was added. The video lasts for 15 seconds, and is usually an ad for another mobile game. The user gets a few coins every time they watch a video, up to a maximum of 10 times a day. Dirtybit gets ad revenue from every video watched. It would also be a good idea to monitor how these new ways to earn coins (daily challenges and watch a video) impacts the revenue from in-app purchases.

Based on the feedback received by support, it appears that the users want more control over their own accounts, which is understandable. Implementing this should be a priority, because happy users are likely to keep using the product longer, and it will also reduce the workload for support, saving money on wages. A good idea here could be to charge coins in order to change the username, or reset the rating of an account. This would add another thing the users could spend money on, and might increase the chance of them buying coins, while still not selling advantages to the players.

Going through the prices of items on sale in the market might also be a good idea, seeing as they are priced mostly randomly. A lot of research has been done on this subject, and it should be possible to find a good strategy on pricing items compared to the amount of coins in the coin-packs that are sold.

Implementing a closer connection with Facebook might also be a very good idea. Adding features to invite Facebook friends to a game, regardless of whether or not they have the game, would generate a lot of free marketing. Trying to get even more likes on Facebook, and followers on Twitter, would also be a smart thing to do, as it would not only increase the awareness of Fun Run, but would also make it easier to make a potential sequel to Fun Run, or a new game, popular faster as they can make a lot of people aware of it immediately and for free.

12.2.2 Further Work

There are several topics in this report that be researched further. It would be interesting to follow Fun Run for a longer period of time, as this game was far from done at the end of the data gathering. After the success in USA, which is recorded in this report, Fun Run have been quite successful in several countries in the Middle East, and even reached the first place in the Apple App Store in some countries, including Israel, Bahrain, the United Arab Emirates, Jordan, Kuwait and Saudi Arabia. Investigating how this happened, and why the popularity of the game seems to move from location to location would be quite interesting.

Further work could also be done on investigating how the various revenue streams impact each other, now that Fun Run have implemented new ways to earn money. Seeing how adding the video ads impacts in-app purchases, and seeing if it pays off to have that option in the game, or alternative, if it can be adjusted to be more rewarding, would be very interesting.

The fact that there are so many small companies that make lots of money on the mobile market, compared to the bigger and more famous gaming companies, like Electronic Arts, is also something that is quite interesting. Some of the reasons for this is discussed in this report, like the fact that there are so easy to release games on the mobile platforms, but this is an area that deserves to be further investigated.

Further studies on the business models of mobile games could also be valuable. Considering how this is only a study of one game, it would be interesting to compare the results of this study with other games, using the same or a different business model. It would also be interesting to see whether the results of these studies would change over time, as the mobile app market is still in development, and will

probably be undergoing changes for quite a while yet. In-app purchases seems to be the best business model at the moment, but this might change when something new comes along, or an existing technology is used in a new way. This should be investigated when or if it happens.

The fact that Google launched their Google Play Services in May might also impact the future of mobile multiplayer games, as it will probably be easier to make them using this service. It would be interesting to keep an eye on how this market develops in the coming years.

References

- [1] VisionMobile. Developer economics 2013, January, 2013.
- [2] Apple. App store tops 40 billion downloads with almost half in 2012. Press release: <http://www.apple.com/pr/library/2013/01/07App-Store-Tops-40-Billion-Downloads-with-Almost-Half-in-2012.html>.
- [3] Google. Google play hits 25 billion downloads. Press release: <http://officialandroid.blogspot.no/2012/09/google-play-hits-25-billion-downloads.html>.
- [4] Google IO Keynote Speach. May 15th, 2013. http://www.youtube.com/watch?v=9pmPa_KxsAM.
- [5] Robert K. Yin. *Case Study Research: Design and Methods*. SAGE Inc., 2009.
- [6] John Koetsier. Android up 13%, ios down 7%, blackberry down 81% ... and windows phone up a massive 52%. VentureBeat. <http://venturebeat.com/2013/04/01/android-up-13-ios-down-7-blackberry-down-81-and-windows-phone-up-a-massive-52/>
- [7] Arnold Kim. Over 5000 'overtly sexual' apps pulled from app store (and counting). <http://www.macrumors.com/2010/02/21/over-5000-overtly-sexual-apps-pulled-from-app-store-and-counting/>.
- [8] John Koetsier. How \$96,000 can buy you a top 10 ranking in the u.s. app store. VentureBeat. <http://venturebeat.com/2013/06/04/how-96000-can-buy-you-a-top-10-ranking-in-the-u-s-app-store/>.
- [9] Dave Wooldridge and Michael Schneider. *The Business of iPhone and iPad App Development: Making and Marketing Apps that Succeed*. Appress, 2011.
- [10] Apsalar. Top mobile game categories by in-app purchases & engagement. <https://apsalar.com/blog/2013/02/top-mobile-game-categories-by-in-app-purchase-engagement/>.
- [11] Jan A Audestad. Positive feedback from the market: network externalities. *Technical note at the Department of Telematics, Norwegian Unniversity of Science and Technology*, 2007.

- [12] Theresa Howard. Usatoday: Viral advertising spread through marketing plans, 2005. http://usatoday30.usatoday.com/money/advertising/2005-06-22-viral-usat_x.htm.
- [13] J. Schell. *The art of game design: a book of lenses*. Morgan Kaufmann. Elsevier/Morgan Kaufmann Publishers, 2008.
- [14] Flurry. App engagement: The matrix reloaded. Flurry blog: <http://blog.flurry.com/bid/90743/App-Engagement-The-Matrix-Reloaded>.
- [15] Christopher Marc. Top 25 facebook games for december 2010. <http://www.insidesocialgames.com/2010/12/01/top-25-facebook-games-for-december-2010/>.
- [16] Karsten Strauss. Is this the fastest-growing game company ever? <http://www.forbes.com/sites/karstenstrauss/2013/04/17/is-this-the-fastest-growing-game-company-ever/>.
- [17] Dean Takahashi. Angry birds creator rovio says merchandising is 30 percent of revenue. <http://venturebeat.com/2012/05/07/angry-birds-creator-rovio-says-merchandising-is-30-percent-of-revenue/>.
- [18] Christopher Foley. Breaking down candy crush's formula for success. Kontagent Kaleidoscope. <http://kaleidoscope.kontagent.com/2013/04/19/breaking-down-candy-crushs-formula-for-success/>.

Appendix A

Survey Questions

The survey consisted of the following questions and alternatives.

What is your username?

Text field input.

What device are you playing Fun Run on?

More than one option can be chosen.

- Android phone
- Android tablet
- iPhone/iPod
- iPad

For how long have you been playing Fun Run?

- Over a month
- 3-4 weeks
- 1-2 weeks
- 3-6 days
- 1-2 days

How often do you play Fun Run?

- Once a week or less
- A few times a week
- Almost every day
- Every day
- Several times every day

How many games do you usually play in a row, once you start playing?

- 1-2 games
- 3-6 games
- 7-10 games
- 10 or more games

How did you hear about Fun Run?

More than one option can be chosen.

- Facebook
- Twitter
- Instagram
- At school/work
- From friends/family outside of school/work and social media
- Other (input field)

Have you bought in-game coins in Fun Run?

- No
- Yes, for \$1.99
- Yes, for \$4.99
- Yes, for \$9.99
- Yes, for \$24.99
- Yes, for more than \$24.99

Where do you usually play Fun Run?

Give a score of 1 to 5 where 1 is very never, and 5 is all the time.

- At school/work
- When traveling
- At home
- At parties
- When waiting

How often do you play with the following types of opponents?

Give a score of 1 to 5 where 1 is very never, and 5 is all the time.

- Friends
- Family
- Random opponents in quick play
- Random people you have added as friends

Other than the actual gameplay, what do you think it is that makes Fun Run fun?

More than one option can be chosen.

- That you can play against friends
- That it is fast and easy to peak up
- That you can purchase new skins
- The ranking list
- The graphics animations
- Other (input field)

To what degree does the following factors make you want to try a new mobile game?

Give a score from 1 to 5 where 1 is not very much, and 5 is very much.

- Good reviews/many stars in the App Store/Play Store
- Recommendations from a friend
- The game is high on the ranking lists in the App Store/Play Store (many downloads)
- Whether or not the game has ads or in-app purchase
- The price of the game

To what degree does the following factors make you keep play a game?

Give a score from 1 to 5 where 1 is not very much, and 5 is very much.

- Achievements
- Unlockable content
- Regular updates from the developers (new content)
- Leveling up

How do you feel about games that makes money in the following ways?

Give a score from 1 to 5 where 1 means that you do not like it at all, and 5 means that you don't mind.

- Free games where you can buy advantages using real money
- Free games where you can buy cosmetic changes using real money
- Games that cost money to buy
- Free games with ads
- Free games where you have to pay to get all the content

Do you have any other comments?

Text field input.